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DISCOVERIES AND CURRENT EVENTS *

French West Africa : Latest Locust Invasions and Locust Control in the Colonies of Dahomey, Upper Volta and Senegal (1).

Dahomey. — Locusts appeared in the 'Cercles' of Dahomey in December 1929 ; the first swarm was reported near Allada in the regions of Tori and Niaouli on 5 December. Since then they have never ceased circulating in the interior of the Colony. The table below gives details of the swarms and the directions taken by them.

All the swarms were composed of yellow locusts. Towards 24 April masses of pink locusts were reported in the region of Bohicon at Savé. Some of the swarms merely crossed certain Cercles, staying only a few minutes and then going towards the frontiers of Nigeria, Togoland or towards the north of the Colony. On the other hand in some regions great masses of the insects settled and remained causing serious damage, specially to the maize fields, which in some Cercles were completely destroyed. The damage was worst in December because the natives sowed late after the floods on the low parts had subsided.

The most important migrations were in the dry season and the direction was influenced by the winds.

The breeding ground in Dahomey has not been discovered ; the passage of young pink locusts was merely noted, as is mentioned above, in the regions of Bohicon at Savé.

In consequence of the enormous damage by locusts in December a serious campaign was undertaken.

Instructions were given to all the Cercles to keep constantly in touch with each other so as to enable the available methods of control to be got into action as rapidly as possible. The communication consisted in telegraphic notification of locust flights to all the Administrators, signalling rapidly from village to village the observations made at a given point. The Commandants of the frontier Cercles also were instructed by circular to warn the Administrators of the nearest divisions of neighbouring Colonies (including foreign ones) by the most direct method.

In addition to these measures of a general nature which enabled neighbouring territories to be warned of the arrival of swarms and to take the necessary steps for their destruction, a local Decree was issued in April 1930 which ordered the inhabitants of invaded territory to make in turn a daily beat to ascertain where the locusts were

* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Communication from the General Government of French West Africa, official correspondent of the Institute.

Dates of appearance of swarms	Places passed	Direction
5 December 1929	'Cercle' Allada (Tori Niaouli). .	...
5	Grand-Popo (Canton Adja)	North
»	»	»
»	Allada	South
»	Moyen Niger (vallée Mékrou)	North and South
»	Holli-Kétou (Hollidjé) . .	South
11	Zagnanado	»
11	Savalou (Tchetti)	North West
13	Zagnanado (Cantons Cové, Banamé, Dovi). .	Abomey
14	Porto-Novo	Holli-Kétou
14	Holli-Kétou (Kétou-Hollidjé) . .	»
16	Allada (région Couffo)	North
17	Abomey (région Cana)	»
18	Grand-Popo (Subdivision Popa)	»
20	» (Locossa and Athiémé)	»
20	Allada	South
30	Holli-Kétou (Pobé)	Porto-Novo
4 January 1930	Savalou (Canton de Mahi)	»
6 »	Savalou (route Tchatti)	North
8 »	(Subdivision Savé)	Nigeria
9 »	(région Banté)	North East
12 »	Savalou	South
15	Grand-Popo (Subdivisions Athiémé and Bopa).	West
20	Allada	North East
21	Zagnanado	West
24	Savalou (Subdivision Savé)	»
31	» (région Dassa)	»
31	» Abomey	East
18 February 1930	Djougou (route N'Daly)	North
2 March 1930	Djougou	North West
7 »	Savolou (Cantons de Mahi, Savalou, Djaloukou Dassa, Savé)	»
23 »	Savalou (Subdivision Savé)	West
1 April 1930	Porto-Novo (Subdivision Adjohon)	South
14 »	Allada (région Agbanou)	East
24 »	Abomey and Savalou (Bohicon-Savé)	»
9 May 1930	Savalou (région Djaloukou)	West
21 »	Allada (région Dodji)	East
21 »	Grand-Popo (Subdivision Bopa)	»
22	Holli-Kétou	North East
22 »	Grand-Popo (région Konoukoué)	North West
23	Moyen-Niger (Kandi)	North
24	Moyen-Niger (Guéné)	North East
26	Allada	»
27	Moyen-Niger (Guéné)	West
2 June 1930	Moyen-Niger (Kandi)	South East
9 »	Porto-Novo (Subdivision Adjohon)	North

alighting to breed. Various other measures were also prescribed, such as, catching hoppers, burying the bodies, destroying eggs, prohibiting the killing of insectivorous birds, etc.

Prizes were promised to all persons bringing a certain number of dead hoppers.

At the beginning of the campaign one was constantly coming up against the prejudices of the natives who always seek a supernatural cause for the simplest facts and start looking for new fetishes to deal with the evil.

But in view of the very serious risk to crops constituted by the masses of locusts reported in the different regions the various instructions were put into practice : the villages fought against the scourge, numerous gangs were organised and considerable quantities of hoppers destroyed.

The beginning of the rainy season seems to have freed the Bas-Dahomey from the locust invasions. But unfortunately they continued to be reported in the northern Cercles where the rain storms were less heavy and less frequent.

On 17 July 1930 a cloud of locusts was reported above Parakou. Control was actively carried out in combination with the neighbouring Colonies.

Upper Volta. — In consequence of irregular rainfall in the early winter the sowing of food crops was begun in unfavourable conditions and was some-

what seriously retarded. Later however the rainfall became more abundant and better distributed and the sowing was able to be undertaken afresh and carried out without any hindrance.

The original doubtful situation was thus apparently remedied and the sprouting, which was in general normal, was making it possible to hope to retrieve the lost time when a number of locust swarms spread themselves over the whole territory, causing serious damage to the large and small millets.

The most affected Cercles were Dédougou, Koudougou, Kaya and Ouagadougou, where there was much locust damage, necessitating resowing.

The present locust invasion seems to be of local origin and to result from hatching of eggs laid by swarms coming from the frontier regions into the Colony during the last quarter of 1929.

Information gathered in the different Cercles in fact reports the appearance of adults and hoppers at approximately the same dates.

On the other hand, hoppers hatched in certain regions are already in full flight while in others they are still at the moulting stage.

In spite of the efforts at control being displayed up to the present time in all the affected regions they are unable owing to their quite recent organisation to give satisfactory results as yet.

Even if it has been possible in certain places to reduce the size of the swarms of adults or hoppers the danger is far from having been warded off and the risk of invasion persists.

There is need, it is true, to bear in mind that the task is difficult and that economic and genuinely effective methods are lacking when it is a matter of reaching winged locusts.

Flame throwers and the Herell process do not as yet appear to have protected the countries which have employed these methods which are particularly costly and require much skilled labour, which it would be difficult to find in this Colony.

The only control method which is now recommended is the systematic search for breeding grounds and the collection of eggs. This is in all cases concerning the inhabitants and finances of the Colony the only practical method.

Instructions to this end are already in preparation and a plan is in course of organisation which will make the existing campaign against invading locusts more methodical and will ensure a more effective protection of crops.

Senegal. — The presence of locusts was reported in the Cercles of Tambacounda, Kédougou and Bakel. Some swarms passed through the Kaolack district, but without causing serious damage.

The inhabitants of the Colony are aware of the danger to their crops and help and collaborate in the control measures carried out under the direction of the Administration to keep off and kill locusts.

In the Cercles of Tambacounda and Kédougou defence gangs formed by the Cercle police have been organised and work actively at locust destruction. The work is directed by the Commandants of the Cercles.

As soon as a place where hatching is occurring is located the gangs go there early in the morning and beat the hoppers with branches while they are still numb with cold. Those which have not been crushed attempt to scatter but are at once collected and thrown into previously dug trenches, covered in with soil and stamped on.

Considerable quantities of hoppers have been destroyed in this way within the boundaries of Tambacounda and thus numbers of locust swarms avoided.

The evil seems to be checked for the moment in Tambacounda ; there is no lon-

ger reason to fear the arrival of swarms from the Sudan or neighbouring regions. According to information from local natives the hatching centre is in southern Boun dou, Cercle of Bakel.

Algeria: Pink Bollworm of Cotton (1).

Preliminary results of an enquiry now in progress enables it to be stated that the pink bollworm *Gelechia (Platyedra) gossypiella* occurs in all the cotton growing regions of Algeria. Contrary to what had been thought up to the last few weeks it is found in the Orléansville district, the percentage of infested bolls being often very high. Infestation seems up to the present less serious in Mostaganem. In the Oran district the most serious centres of infection are found; the bollworm occurs in all parts, but the situation is most grave at Perrégaux and St Denis-du-Sig, where it may be said that practically all the plantations are infested. The amount of contamination varies however, not only from one estate to another but even in adjacent plots of one estate; if it is insignificant or low (2 to 5 %) in certain plots it may be very high in others, up to 30 and 40 % of infected bolls having been recorded early in October.

Arrangements have been made for the strict application of the measures ordered by the Prefectorial Decrees of 28 and 31 March 1930, viz., the burning immediately after picking, or at latest before 15 January, of all plants left in the fields and the disinfection of seed. The latter as a result of an agreement between the Administration and the ginners will be carried out at one station, which will be at Oran, by means of hydrocyanic gas and will be under the direct control of officials of the Service for Plant Protection. The tanks already installed allow of the treatment of 30 tons a day.

The use of luminous snares was considered, but as their effect is still much disputed the Administration decided not to prescribe them formally until they have been tested at the Experimental Farm at Ferme-Blanche, near Perrégaux. At this station on 17 and 18 September when the moths were only beginning to emerge 7 acetylene lamps snared 23 and 75 moths, then when more were emerging the figures in the fortnight between 19 September and 4 October reached 1834, or 17.46 moths per lamp per day, distributed as follows:

19 September 1930	. . . . .	100
20 »	. . . . .	95
21 »	. . . . .	151
22 »	lamps not lighted.	
23 »	. . . . .	85
24 »	. . . . .	106
25 »	. . . . .	137
26 »	. . . . .	128
27 »	. . . . .	126
28 »	. . . . .	196
29 »	. . . . .	147
30 »	. . . . .	135

(1) Communication from the official correspondent of the Institute, Mr. Delassus, Inspecteur de la Défense des Cultures, Algiers.

1 October 1930 136
2 " 93
3 " 137
4 " 50

The number taken would certainly have been higher if the snare used (an acetylene lamp above a tank containing water and petrol) could have been replaced by the type used for the last year in certain factories in Algiers for the control of the cigarette-beetle (*Lasioderma serricorne*); this consists of paper glued on both sides and fixed on a framework arranged round a light.

Other observations have also been made at Perrégaux. It has been noticed in particular that the snares should not be lighted only in the evening, the takings at dawn often being greater. It was found on the other hand that acetylene had sufficient power of attraction and that it did not appear necessary to use blue screens, as recommended by certain writers.

The attack of the pink bollworm is thus general in Algeria, although varying in intensity in different regions, but the rigorous application of the prescribed control measures may allow of a considerable reduction in damage.

Cyrenaica: Insect Pests (1).

During the three months July-September 1930 the following plant pests were found in Cyrenaica :—

(1) *Apate monachus* F. Numerous examples of the adult form of this beetle (fam. *Bostrychidae*) in the trunks of *Melia Azedarach* in the Royal Nurseries of Benghazi. The attacked trees were cut down and buried.

(2) *Opatroides punctulatus* Rttr. Already reported as injurious to vines (cf. this *Bull.*, Year IV, No. 10, p. 146), attacked the bark of mulberry trees also during the summer. In the nurseries of the Agricultural Section of Barce for the control of this beetle a mixture of 500 gr. of 'Urania' and 100 kg. of bran were spread round the plants, with excellent results.

(3) *Aegosoma scabricorne* Scop. Dead females and large larvae of this beetle (fam. *Cerambycidae*) in the branches and trunks of apricot trees in the oasis of Derna. Winter pruning has been recommended in addition to the complete removal of the most badly affected trees.

United States of America: Outstanding Entomological Features (2).

The present notes refer to August, 1930.

The serious grasshopper conditions reported last month continued during August and particularly serious outbreaks occurred in Idaho and northern Utah.

The pale western cutworm (*Porosagrotis orthogonia* Morr.) was reported as lo-

(1) Communication from the official correspondent of the Institute, Mr. G. Kruger, Director of the Entomological Laboratory of the R. Ufficio per i Servizî Agrarî della Cirenaica, Benghazi.

(2) Communication from the official correspondent of the Institute, Mr. J. A. Hyslop, Senior Entomologist in Charge, Insect Pest Survey, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

cally serious in Utah, and the Bertha armyworm (*Barathra configurata* Walk.) was reported in outbreak numbers in the northeastern corner of North Dakota, during August.

The periodical outbreak of the white-lined sphinx (*Celerio lineata* Fab.) reported from Nevada extended westward into the Lake Tahoe region of California.

The dry weather conditions of July extended through August and, as was to be expected, damage by the red spider (*Tetranychus telarius* L.) continued throughout the month.

The Hessian fly (*Phytophaga destructor* Say) infestation in New York State as a whole is light, averaging for the State 3.7 per cent. In southeastern Nebraska about 80 per cent. of the puparia were dead by the last of July, largely as a result of the hot, dry weather.

The fall armyworm (*Laphygma frugiperda* S. & A.) continued its depredations during August throughout the Gulf Region.

Very severe damage by several species of corn root worms is reported from southwestern Nebraska; *Diabrotica virgifera* Lec. was the most destructive species. A species heretofore of practically no economic importance, *D. filicornis* Horn was also seriously numerous.

The velvetbean caterpillar (*Anticarsia gemmatilis* Hbn.) is again appearing in the unusually high summer temperatures, and severe late injury is reported from the entire drought area.

The oriental fruit moth (*Laspeyresia molesta* Busck) is apparently not unusually abundant throughout the New England and Middle Atlantic States; in fact twig infestation has been lighter than usual over much of this territory. This condition extends southward to Georgia and westward to Indiana.

The plum curculio (*Conotrachelus nenuphar* Hbst). seems to be unusually abundant throughout the Northern States and at a very low ebb in the South.

The citrus whitefly (*Dialeurodes citri* Ashm.) and the citrus rust mite (*Eriophyes oleivorus* Ashm.) have been more troublesome than usual in Florida. This is believed to be due to the dry weather inhibiting the development of entomogenous fungi.

Blister beetles are generally prevalent and destructive throughout the East-central and North-central States.

The asparagus beetle (*Crioceris asparagi* L.) is definitely recorded for the first time from southern California. The pest has been more or less serious throughout central California for a number of years.

In Massachusetts the Mexican bean beetle (*Epilachna corrupta* Muls.) has been found to be well distributed over the Connecticut Valley region of Hampden County and northward into Hampshire County. The pest has also been found in a few instances in Franklin County. In the older infested States in the drought area the insect was reduced to a negligible factor by the high temperatures.

Tobacco hornworms (*Protoparce* spp.) are very decidedly less abundant than usual in the Tennessee tobacco-growing districts.

The saddled prominent (*Heterocampa guttivitta* Walk.) is appearing in outbreak numbers in the New England States where it is defoliating large areas of beech and maple.

The gipsy moth (*Porthetria dispar* L.) is at a low ebb of abundance but the brown tail moth (*Nygmia phaeorrhoea* Don.) is showing a decidedly upward trend in the New England States.

A repetition of the outbreak of the green-striped maple worm (*Anisota rubicunda* Fab.) which occurred in 1917 and 1918 is occurring in parts of Massachusetts and Connecticut.

* * *

The following notes refer to September, 1930.

Grasshoppers still continue to attract considerable attention throughout the greater part of the country. In many places the damage has even increased over that done in August.

Special species of cutworms (*Noctuidae*) are reported from the Rocky Mountain and the West Coast States.

The fall armyworm (*Laphygma frugiperda* S. & A.) became generally prevalent over the Middle Atlantic States during the month, attracting unusual attention by attacking lawns in towns and cities.

Damage by white grubs (*Pyrilophaga* spp.) is becoming very evident, as it advances, in the Central States from Indiana westward to Nebraska, and southward to Missouri.

The Hessian-fly situation as a whole is not alarming. From conditions in southern and west central Illinois and parts of Missouri and Indiana however, there is reason to believe that unless checked by adverse weather conditions this insect will be decidedly more troublesome next year in this region than it has been in several years.

The cotton leaf worm (*Alabama argillacea* Hbn.) made one of its very extensive northward flights about the middle of September. The moths were observed in large numbers in southern Missouri on September 14; in southern Illinois on September 15; in the District of Columbia on September 23; in southern Michigan and New York City on September 24; and in Boston, Mass., on September 25.

Codling moth (*Carpocapsa pomonella* L.) eggs continued hatching during the first two weeks in September in Illinois, Indiana, and Kentucky, and moths were still emerging in central Ohio during the third week of the month.

In the Lake Region of Ohio a late brood of the oriental fruit moth (*Laspeyresia molesta* Busck) seriously damaged late varieties of peaches harvested after the middle of September. To the southward, in Indiana, Illinois, and Kentucky, infestation seemed to be much less serious, particularly in apple, and only moderate abundance is reported over the New England and South Atlantic regions.

A green stink bug (*Chlorochroa sayi* Stal) is recorded from the State of Nebraska for the first time. It was found injuring potatoes in Kimball County.

The imported cabbage worm (*Pieris rapae* L.) is very seriously infesting cabbages in Illinois, Iowa and Minnesota, and rather serious infestations by the cabbage webworm (*Hellula undalis* Fab.) are reported from North Carolina, Alabama, and Mississippi. The cabbage looper (*Autographa brassicae* Riley) is appearing in very considerable numbers over the same region and also northward into Virginia.

The beet leafhopper (*Eutettix tenella* Baker) is abundant in northern Utah and considerable damage is resulting from the infestation.

The fall webworm (*Hyphantria cunea* Drury) is occurring very abundantly throughout the eastern States from Vermont southward to Florida and Alabama.

The birch leaf skeletonizer (*Bucculatrix canadensisella* Chamb.) is occurring in a heavy outbreak in northern Maine and the upper and lower peninsulas of Michigan.

The elm leaf beetle (*Galerucella xanthomelaena* Schrank) is so prevalent in Connecticut that unsprayed trees are brown in many parts of the State, and it is more prevalent at Raleigh, N. C., than it has been during the past fifteen years.

Hungary: Damage to Vineyards by Sparrows (*Passer domesticus*) (1).

During the last two years sparrows have increased to an unusual extent and in August 1930 damaged the early grapes in an unprecedented degree. The sparrow is more difficult to combat than the starling (*Sturnus vulgaris*). The starling flees from man, even when unarmed ; it can also be kept away by noise-producing instruments. The sparrow on the contrary is used to noise and cannot be kept off the grapes by shouting or noises. They can only be got rid off therefore with firearms. It is practically impossible to carry out a campaign against sparrows' nests throughout a whole country. It seems easier to kill the birds in their winter roosts. Such roosting places exist even in Budapest, where the sparrows from autumn to spring perch for the night in the trees in streets and public gardens in such numbers that their droppings impede the traffic. The only method which gives hope of destroying these masses of birds consists in watering them during frosty winter nights with fire hose. The sparrows thus rendered incapable of flight would fall to the ground and could be put at the disposal of hospitals for food purposes. But the Societies for the protection of animals would probably be opposed to such a method, which could be employed only by official authorisation.

Persia: Some Insect Pests (2).

Earias insulana. — This cotton parasite was reported in Persia for the first time in 1928 by the entomologist of the Russo-Persian Society in the province of Kirman (Bam and Rafsendjan). In 1929 it was reported in the province of Fars and, in 1930, according to information collected by Mr. Dijé, in addition to the southern provinces it has made its appearance at Ispahan, Yezd, Kashan, Kum, Khar and Veramine (Teheran) and in the Khorassan. The losses are estimated at

(1) Communication from the official correspondent of the Institute, Mr. Titus Csörgey, Director of the Royal Hungarian Institute of Ornithology, Budapest.

(2) Communication from the official correspondent of the Institute, Mr. Ahmed H. Adle, Director of the Agricultural College, Keredj, Teheran, Persia.

30 % of the crop in Kizman and up to 52 % at Torchize (Khorassan). *E. insulana* did not occur in Persia before 1928 when it came from India.

Eurygaster integriceps. — Following its normal development this serious wheat pest has increased its ravages since 1924, in which year it did its maximum damage. In 1930 a great part of the crop of the Veramine district was destroyed and in certain villages not even $\frac{1}{3}$ or $\frac{1}{4}$ of the crop was harvested. A renewed attack is expected in 1931.

Locusts. — Locust damage has been less in 1930 than in 1929, the province of Teheran in particular escaping damage. On the other hand the province of Azerbaïdjan which had hitherto not suffered from locusts was invaded by large swarms coming from Turkey. Defensive measures were taken from the first and special missions were sent into nearly every province, in particular into Kirman Beloutchistan (locusts coming from India), Fars, Khousistan, Louristan, Kirmanchah, Ispahan, Yezd, Kachan, Khorassan, Azerbaïdjan, etc.

In some regions, in addition to *Schistocerca gregaria*, the presence was reported of the Moroccan locust (*Dociostaurus maroccanus*), which was easily destroyed, whereas the attacks of *Schist. gregaria* were sometimes very serious.

Active measures are already in hand for 1931. In particular a defensive chain will reach from the Mesopotamian frontier along the Persian Gulf coast to the Indian frontier, in order that the insects may be combatted as soon as they appear in Persia and, if possible, to discover the breeding grounds, which may exist in the South, specially in Deschti and Deschtistan.

Hellenic Republic : Locust Campaign 1930 (1).

In 1930 28 out of the 36 Departments were declared infested with locusts.

The invasions were equal to those of last year.

The destruction work was carried out more willingly by the inhabitants, who are compulsorily obliged to supply the labour.

The expenses rose to 40,000,000 drachmas, of which 12,000,000 were used for buying petrol, 5,000,000 for bran, 1,500,000 for molasses, 2,000,000 for sodium arsenate, 2,000,000 for spraying apparatus and accessories and 18,000,000 for transport charges and wages.

The amount spent on petrol would have been less if in the Departments of Florina, Kozani and Achaïa arsenical bait had been spread earlier, instead of spraying with petrol. In fact, half the total quantity of petrol *i. e.*, 150,000 15 kg. tins, was consumed in these three Departments.

The abundant spring rainfall washed away the bait and obliged the district Services to renew it, which increased the expenses.

The control was perfectly successful. The locusts caused no damage.

The number of stock animals poisoned by the bait was very small this year, while last year it was considerable.

(1) Communication from the official correspondent of the Institute, Mr. C. A. Issaakides, Technical Advisor to the Minister of Agriculture, Athens.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

South Australia. — By Notice of the Minister of Agriculture of 22 April 1930 the attention of landholders and local authorities is directed to the fact that they are required by law to destroy any of the following noxious weeds growing on lands and roads respectively held by them, and that the penalties for neglect will be strictly enforced :—

Asphodelus fistulosus, Cenchrus tribuloides, Centaurea Calcitrapa, C. solstitialis, Chenopodium album (for City of Adelaide only), *Cnicus arvensis, Conium maculatum, Cuscuta, Datura Stramonium, Euphorbia Terracina, Gomphocarpus fruticosum, Homeria collina, Hypericum perforatum, Kentrophyllum lanatum, Lycium campanulatum* except where grown as a hedge and kept trimmed to a width of 4ft. 6in. and to a height not exceeding 10ft.), *Solanum rostratum, S. sodomoeum, Xanthium canadense, X. spinosum.* (*The South Australian Government Gazette*, Adelaide, September 11, 1930, No. 11, p. 544).

Spain. — Royal Decree No. 2,214 of 11 October 1930 which establishes the regulations for the exportation of citrus fruits provides, *inter alia*, that no fruits attacked by scale insects or other parasites or damaged by frost may be exported. (*Gaceta de Madrid*, Madrid, 12 octubre 1930, año CCLXIX, tomo IV, núm. 285, pags. 275 a 278).

India (1). — By Notification No. 1213-Agric., dated the 27th May, 1930, in exercise of the powers conferred by sub-section (1) of section 3 of the Destructive Insects and Pests Act, 1914 (II of 1914), the Governor General in Council is pleased to direct that the following further amendments shall be made in the Order published with the Notification of the Government of India in the Department of Revenue and Agriculture No. 580-240, dated the 22nd June 1922, namely :—

1. In sub-paragraph (i) of paragraph 1 of the said Order, for the word " Schedule " the words « first Schedule » shall be substituted.

2. For sub-paragraph 2 of paragraph 11 of the said Order the following shall be substituted ; namely :

" (2) Cotton seed shall not be imported by sea save for experimental purposes by one of the officers named in the second Schedule appended hereto, and shall not be so imported by such officers save at the port of Bombay and in quantities not exceeding one hundredweight in any one consignment and on condition that it will be fumigated on importation with carbon bisulphide :

Provided that, if the cotton seed is accompanied by a certificate from a Government Entomologist of the country of origin to the effect that the seed and its container have been treated in such a way as to destroy all insect life, the seed shall be examined on importation by such officer as the Governor General in Council may appoint and shall not be required to be re-fumigated unless such examination shows that refumigation is necessary ".

(1) Communication from Mr. M. S. A. HYDARI, I. C. S., Secretary, Imperial Council of Agricultural Research, Simla, India, to the International Institute of Agriculture.

3. For the heading to the Schedule to the said Order, the heading " First Schedule " shall be substituted and after that Schedule the following Schedule shall be inserted, namely :—

SECOND SCHEDULE.

(Paragraph 11 (2).)

The Director, Imperial Institute of Agricultural Research, Pusa.

The Secretary, Indian Central Cotton Committee, Bombay.

The Director of Agriculture, Madras Presidency, Madras.

The Director of Agriculture, Bombay Presidency, Poona.

The Director of Agriculture, Punjab, Lahore.

The Director of Agriculture, United Provinces, Lucknow.

The Director of Agriculture, Central Provinces, Nagpur.

The Director of Agriculture, Bengal, Dacca.

The Director of Agriculture, Bihar and Orissa, Sabour.

The Director of Agriculture, Assam, Shillong.

The Director of Agriculture, Burma, Rangoon.

The Agricultural Officer, North-West Frontier Province, Peshawar.

The Director of the Institute of Plant Industry, Indore.

The Director of Agriculture, His Exalted Highness the Nizam's Dominions, Hyderabad.

The Director of Agriculture, Mysore State, Bangalore.

The Director of Agriculture, Baroda State, Baroda.

*** By Notification No. 1343-Agri., dated the 21st June, 1930, in exercise of the powers conferred by sub-section (1) of section 3 of the Destructive Insects and Pests Act, 1914 (II of 1914), the Governor General in Council is pleased to prohibit with effect from the 8th August 1930 the import of unroasted coffee beans into the Madras Presidency by sea or, save where the import is from a place within India, by land.

Provided that the prohibition herein before contained shall not apply to a consignment of unroasted coffee beans produced in India and covered by a certificate of origin .

*** By Notification No. 1541-Agri., dated the 23rd July, 1930, in exercise of the powers conferred by sub-section (1) of section 3 of the Destructive Insects and Pests Act 1914 (II of 1914), the Governor General in Council is pleased to direct that the following further amendments shall be made in the order published with the Notification of the Government of India in the late Department of Revenue and Agriculture No. 580-240, dated the 22nd June 1922, namely :—

(1) After paragraph 2 of the said Order the following paragraph shall be inserted, namely :—

" 2-A. No plant shall be imported into British India by air ; provided that plants which are infested with living insects and are intended for the introduction of such living insects may be so imported if they are accompanied by a special certificate

from the Imperial Entomologist to the Government of India that such plants are imported for the purpose of introducing such insects '.

(2) For paragraph 8 of the said Order, the following shall be substituted, namely :—

' 8. Seeds of flax, bersim and cotton shall not be imported by letter or sample post, or otherwise than by sea.

' 8-A. Coffee seeds shall not be imported by letter, sample or parcel post or otherwise than by sea '.

(3) In paragraph 9 of the said Order, the words " by sea " shall be omitted.

(4) In sub-paragraph (1) of paragraph 11 of the said Order, after the words ' by sea ' the words ' or by air ' shall be inserted.

(5) In paragraph 12 of the said Order, for the words " by sea from one port in British India to another " the words " by sea or by air from one port or place in British India to another such port or place " shall be substituted.

Italy. — A Decree of 18 November 1930 fixes new technical regulations for the exportation of citrus fruits. *Inter alia* no consignment may contain over 1 % of fruit contaminated with rot due to lesions, exclusive of rot caused by a defect of an organic character. Exportation of fruits damaged by frost is prohibited ; and lemons and oranges must be from a commercial standpoint free from scale insects. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 21 novembre 1930, anno 7I°, n. 271, pp. 4959-4969, 18 figg.).

*** In Santa Teresa di Riva, province of Messina a compulsory association (' Consorzio ') for the protection of orchards against the ' mal secco ' of lemons (*Deuterophoma tracheiphila* Petri) has been formed of all owners or holders of land situated in the following Communes, which have already been declared infected with the disease :— Santa Teresa di Riva, Savoca, Roccalumera, Nizza di Sicilia and Alì.

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NOTES

International Congresses. — An International Congress of Plant Pathology and Agricultural Entomology is arranged by the Crop Protection League (' Ligue pour la défense des cultures ') to take place in June 1931 under the patronage of the ' Société de Pathologie végétale et d'Entomologie agricole de France '.

An International Congress of Fruit and Vegetable Production is arranged by the Horticultural Society of France for April 1931. It will include a Section dealing with the treatment of crop parasites and the necessary apparatus.

Scientific Films dealing with Agricultural Entomology. — The Italian ' L. U. C. E. ' Institute for propaganda and education by means of the cinematograph, which has its headquarters in Rome (Palazzo della Stamperia), has produced a series of six films dealing with the life history of certain insect pests of agricultural plants or produce. The films were produced under the direction of Prof. F. SILVESTRI, Director of the Agricultural Entomological Laboratory of the ' R. Istituto Superiore Agrario ' at Portici near Naples, and deal more particularly with the following insects :— (1) the Angoumois grain moth (*Sitotroga cerealella* Oliv.) and its parasite *Dibrachys boucheanus* Ratz. ; (2) the olive fly (*Dacus oleae* Rossi) and its parasite *Opius africanus* Szépl. ; (3) *Icerya purchasi* Mask and its natural enemy *Novius cardinalis* Muls. ; (4) the Italian locust (*Callipiamus italicus* L.) ; (5) the corn weevil (*Calandra granaria* L.) and the ' cimice del grano ' (corn-bug) ; this insect is still under investigation and has no scientific name ; (6) the cherry fruit-fly (*Rhagoletis cerasi* L.) ; the olive moth (*Prays oleellus* F.) ; the Mediterranean flour moth (*Ephestia kühniella* Zeller) and its natural enemy *Nemeritis canescens* Nees ; the turnip-gall weevil [*Ceutorrhynchus sulcicollis* Gyll.] ; the cuckoo spit insect [*Philaenus spumarius* L.].

These six films can be supplied on request with explanations in French, English, Portuguese, Spanish and German as well as in Italian.

Prof. ALESSANDRO BRIZI, *Segretario generale dell'Istituto, Direttore responsabile.*

DISCOVERIES AND CURRENT EVENTS *

French West Africa: Locust Control in Dahomey, Upper Volta, Mauritania, Niger, Senegal and French Sudan (1).

DAHOMEY. During July 1930 locust swarms were somewhat rare in most Circles.

In the Circle of the Middle Niger however the swarms were nearly daily from the 1st to the 10th. The table below gives details of the swarms and their direction of flight.

Date of record	Places passed	Direction of flight
July 1-10 (nearly daily)	Circle of Middle Niger (Kandi)	S. W. and N. E.
» 16	» » Borgou (Parakou)	West
» 17	» » Borgou (Parakou)	»
» 19	» » Borgou (Niger Road)	»
» 19	» » Borgou (Parakou)	North East
» 26	» » Savalou (Savalou)	» »

The locusts reported were all young.

One swarm, that of the 26th, alighted in the Savalou region and destroyed several maize fields; the other swarms merely passed over the country flying towards the neighbouring Colonies on the east and west.

The records in Borgou were made following wet days, in cloudy weather without any wind.

As a result of the anti-locust campaign certain breeding grounds were discovered during July.

In the Circle of Djougou locusts laid eggs along the boundary of Togo in the districts of Séméré, Aledjo, Partago and along a line from Taneka-Kora to Sorouba.

In the Circle of the Middle Niger where locusts were reported during the first ten days of the month, eggs were laid in several places.

In the Circle of Savalou (district of Savé), although no breeding ground was definitely located, judging by the appearance of hoppers eggs were deposited between the Ouémé and the Okpara south of the parallel of Savé and in the regions of Dassa-Zoumé, Paouingnan between the Ouémé and the Zou.

During August the swarms were less numerous.

* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Communication from the General Government of French West Africa, official correspondent of the Institute.

They were reported only in the regions of Savalou and the Middle Niger.

The first came from the west and south-west and passed over on the 1st, 5th, 6th and 7th in a north-easterly direction. They caused some damage to maize crops.

Another swarm appeared on the 28th in the Middle Niger between Alfacora and the river Kokoye ; it went in the direction of the Niger.

No breeding ground was discovered this month.

No swarms were reported in Dahomey during September.

UPPER VOLTA. The anti-locust campaign was carried on actively ring the third quarter of 1930.

A local Decree dated 25 July 1930 prescribed the necessary measures to combat locust invasions and the requisition of natives for locating, collecting and destroying locusts.

In all places where large swarms of adult locusts have made their appearance these measures have been rigorously carried out and a large number of locusts killed.

All the efforts however to abate the scourge have made no appreciable difference as yet to the situation.

Numbers of swarms have again been reported, more particularly in the second half of September.

MAURITANIA. No part of the Colony has remained free from migrating locusts.

The invasion began in the middle of June 1930 in the Guidimaka, then locusts appeared in succession at Tidjikdja on July 25, at M' Bout on August 2, Akjouit on the 7th, Kiffa, Tamchakett and Kaedi on the 13th, Port-Etienne on the 16th, Atar on the 21st and Boutilimit on the 22nd.

Then the hatching period began and while the Guidimaka was already infested with migrating hoppers in mid-July similar swarms appeared at Boghe on September 8, at Kaedi on the 11th, Kiffa and M' Bout on the 13th and at Tidjikdja on the 18th.

When development was completed the locusts took flight and a second series of swarms crossed Mauritania, appearing at Port-Etienne on October 1, at Kiffa and Chinguetti on the 3rd, at Boghe on the 9th, at Kaedi on the 10th and at Atar on the 22nd.

NIGER. Numerous swarms, some of them large, were reported over nearly the whole extent of the Colony, the maximum being in June. The first came from the north-west and flew south ; those that followed came mostly from the south-west and usually flew to the N. N. E.

No swarms were reported in the Subdivision of Tanout.

On the night of June 27-28 some locusts alighted near the post of Bilma, but flew away in an easterly direction without having done any damage.

The swarms passed over the Subdivision of Tessaoua without alighting ; in the Subdivision of Magaria they alighted only for short spells.

Eggs were marked and destroyed in the Subdivision of Konni, and no hoppers were reported there during the second quarter of 1930.

Large quantities of hoppers were destroyed in the Circle of Tillabéry and the Subdivisions of Say, Dosso, Filingué (Ballol), Madaoua and Tahoua.

The damage was serious in the Subdivision of Téra (Circle of Tillabéry) where a number of fields of small millet covering several hectares were completely destroyed ; the farmers re-sowed with large millet all the suitable land and sowed again large quantities of cow pea.

In the other Subdivisions of the Colony the damage was nil or insignificant in the second quarter ; it was however serious in Nigeria, specially in the regions of Sokoto and Maidoungouri.

At the end of July somewhat serious damage to the small millet crops was reported in the Circles of Niamey, Dosso and Maradi, but the groundnuts were not attacked.

Locust control was actively carried on throughout the whole Colony.

A decree is about to be enacted which will make it permissable to commandeer natives in cases of large invasions, and will provide for the tracking down and watching of breeding grounds and the destruction of hoppers as they emerge by burying and burning.

Senegal. The passing of locust swarms did not slacken during the third quarter of 1930. Their presence was reported over nearly all the territory. The Circle of Haute-Gambie was particularly troubled ; in certain cantons the crops were entirely lost.

The anti-locust campaign has never been so active. The defence gangs helped by the inhabitants attacked the locusts with branches, killing considerable quantities. Unfortunately the wooded regions often afford shelter from which it is extremely difficult to dislodge the locusts.

Wherever hatching was reported the hoppers were led into trenches, stamped on and covered in with earth.

The Administrator of Casamance reported in July 1930 that locusts which had alighted in the Circles of Bignona and Sedhiou had flown away in the direction of Portuguese Guinea.

It seems to be ascertained from information received at the chief town that the invasions came from the Sudan and Guinea.

French Sudan. If it is a fact, as the natives in the French Sudan assert, that locusts have invaded the territory for thirty years and bred there for five or six, it is none the less true that the serious invasions of the last two years have been the first which have made control measures necessary.

The recognised methods of control could not be effectively applied in 1929 owing to the sudden and unexpected nature of the attack. But in 1930 all arrangements were able to be made in time to check as far as possible the damage, which would in certain regions have meant the complete destruction of all the growing crops.

(1) Flying Swarms. Locust swarms generally follow the direction of the winds they encounter, sometimes from east to west, sometimes from west to east. The same swarm in different stages of development may pass and re-pass several times over nearly the same point without it being recognised. Also they are always reported as coming from neighbouring Circles or Colonies whereas it would be well to admit that some of them originate from the colonies of hoppers whose hatching is reported from most directions some time after the passing of locusts.

In April 1930 locusts made their first appearance in the Southern Circles (Koutiala, Sikasso, Bamako, Ségou). It was only later that they were observed in the east (Ansongo, mid-June) and north (Niafunké, end of June). In July and August the swarms became more frequent and were reported over most parts of the territory.

(2) Protection against Locusts. We are unfortunately practically at the mercy of locusts. Noise and smoke screens — thickened in some places by the use of petrol — do not always stop them, specially as in winter the grass is too damp to serve as fuel.

Crushing of the adults during copulation does not give really satisfactory results.

Better results might perhaps be obtained if it were possible to use flame-throwers of a type similar to that used in the army. They could be manipulated by experts, who would be easy to recruit among the old riflemen and could be rapidly transported under the direction of a non-commissioned officer to the scene of action on horseback or in lorries.

(3) Oviposition. It has been found that locusts can deposit their eggs as well in moist as in dry soil, even when stony, and that they show no preference for either a treeless plain or for brushwood.

Although in very few places the breeding grounds have been located and turned up with the plough — an operation which exposes the eggs to the air and prevents their hatching — it is towards this simple device that the attention of farmers must be turned. The forty-five days of incubation before hatching can easily be made profitable by comparatively few gangs, for the work is simple though it results in the destroying of enormous numbers of future insects. We shall be helped in this work by the memory of the results achieved in 1930 by a campaign which was undertaken in the face of a population convinced that our efforts would be in vain and entirely powerless against a scourge too great for human resistance.

(4) Hatching and Invasions of Hoppers. All the Circles have had hoppers to contend with, but while at certain places — fortunately the most numerous — they have been almost completely destroyed, in others the attack was sudden and so generalised that the people could not cope with it. This was the case in the Circles of Kayes and Macina and in the Subdivision of Kolokani. Everywhere it was necessary first to overcome the indifference of the natives to anything which is not their most immediate concern. Thus newly hatched or migrating hoppers were never reported except by a European or native trader or a travelling Government official, which frequently prevented the control work being started until after serious damage had been done.

Certain Circle Commandants have observed that migrating swarms invariably travel towards the point occupied by the sun at about 9 o'clock in the morning, but that their progress is often affected in the course of the day by changes of wind. Progress is somewhat slow however (a few metres a minute) and the column keeps very compact, except in wooded land, which facilitates their destruction to some extent.

It may be of interest to mention that the Administrator of Macina has observed that hoppers coming from the south cross the Niger between Ké-Macina and Kobry where the current throws them on to the north bank. They then proceed on their way towards the north-east.

(5) Control of Adults. Various methods already in use in the North African Colonies have been recommended, some simple, such as digging pits and trenches and firing, others more perfected, such as ' melhafas ' and poisoned bait.

Melhafas. Tents made of material 3 to 4 metres wide and 10 metres long

were experimented with in all the Circles. Each Circle received at least 10 melhafas in May 1930. This quantity was doubled wherever the ground was particularly suited to this kind of trap. It may be said that the best results were obtained everywhere, except on land covered with dense scrub and on clay soil soaked by recent rain.

Gangs of 200 men and over were instructed in their manipulation in advance so that when invasions occurred they were able to get to work at once, except in the Circle of Gao where the natives turned out to be unskillful in manipulating them. An explanation of this has been sought, because elsewhere the natives had so little difficulty with them that in Koulikoro the women helped even when there were not enough men.

The combination of pits or trenches and melhafas often gave excellent results. The latter were arranged in the form of an open *U* leading the insects to the vertical-sided pits, which were filled in as soon as they were three quarters full.

The following remarks on the use of melhafas may however be noted :—

They are rapidly worn out and end by splitting under the weight of the hoppers about to be buried ; they are difficult to manage in a high wind ; and, as has been said above, they cannot be used in thickly wooded or damp land.

Trenching and Fire. As has just been stated the combination of trenches and melhafas was often used. Sometimes however the melhafas being lacking or the lie of the land not allowing of their use, trenches were just dug along in front of the columns of hoppers and formed a sufficient defence. But this method requires a large number of workers as it must be rapidly planned and carried out.

Fire was used only in cases of complete surprise and, although the natives were sometimes almost burning the straw of the roofs and empty millet barns, the only result was to disperse the insects and so complicate the work of the gangs carrying out a systematic control.

Poisoned baits — Potassium arsenate and molasses were sent into all Circles from May on. These mixed with millet bran formed a bait that most of the Administrators found very effective. In one of the cases reported the mixture was spread in the shape of an open *U* round the head of a column 200 metres wide and 500 metres deep. A hundred kilos of poisoned bait were used. The next day not a locust was alive in the neighbourhood, but innumerable dead ones were piled by the wind at the foot of the trees and ant hills.

It must be added that the use of such poison is not without its drawbacks. Firstly, the quantity of arsenate used in making a whole anti-locust campaign effective would need to be very large. Moreover the use in bulk of such a violent poison is not free from risk unless its use is always under the direction of a European, which is practically impossible.

In spite of the difficulties of application poisoning is the only method of control used on the Gold Coast, the bait being formed of horse dung and chopped grass mixed with arsenate previously diluted with water. This mixture, sprayed at the rate of a petrol tin-full to thirty metres on to swarms which have alighted in the grass for the night, has given very satisfactory results.

It is certain however, and the experience of this season shows, that the use of arsenic is effective only in desert or semi-desert regions where little labour is required.

(6) Results of the Control Campaign. It would be superfluous to describe once more the ravages caused by locusts and hoppers in the plantations. In certain parts the land has been resown as many as six times and now that the danger is in part averted, unless there is a further attack when the

grain is forming, the anxiety of the whole population liable to be brought to starvation at any moment can readily be imagined.

The quantity of hoppers destroyed gives some measure of the danger. It has reached in some places 400 kilos per melhafas daily, and with ten melhafas with pits trebbling their action five or six days were sometimes needed to destroy a single column. In one of the least affected Subdivisions, that of Bamako, seventeen such swarms have been destroyed up to the present.

It should however be reported that the advice to increase the cultivation of the so-called underground crops which are less affected by locusts has been followed. The areas devoted to manioc, potatoes and underground peas have been more than doubled in some places, and there has been considerable increase in the sowing of groundnuts and cotton.

As, on the other hand, the rains although late have been evenly distributed it is to be hoped that the coming harvest will satisfy all needs. It remains none the less true that the results obtained are still inadequate, but the lessons of experience will not be lost and when the time comes the campaign will be renewed with increased means and methods all ready to hand.

England and Wales : New or Interesting Phytopathological Records for the Year 1930 (1).

(*a*) Plant parasitic bacteria and fungi that have been encountered in England and Wales during the year 1930, and that are believed not to have been recorded there previously :—

Bacterium Medicaginis var. *phaseolicola* (Burk.) Link & Hall ; causing the so-called Halo-Blight of Dwarf Bean (*Phaseolus vulgaris*).

Leptosphaeria heterospora (de Not.) Niessl. ; on rhizomes of Iris, but doubtfully parasitic.

Oidium Hortensiae Jørstad ; on Hydrangea leaves.

Puccinia mirabilissima Peck ; on *Mahonia* (*Berberis*) *aquifolium*, rather widely distributed.

Puccinia Opizii Bubák ; aecidial stage in minimal amount on lettuce imported from Holland.

(*b*) Although the parasites themselves mentioned below are not new to the country, yet their attack on the particular hosts in the following short list is interesting as being believed to be the first of the kind recorded for England and Wales :—

Phytophthora Cactorum (Leb. & Cohn) Schroet. ; causing a rot of strawberry fruits.

Leptosphaeria Coniothyrium Sacc. ; in its perithecial stage, upon raspberry canes.

(1) Communication from the Ministry of Agriculture and Fisheries, official correspondent of the Institute.

Glomerella cingulata (Stonem.) Spauld. & von Schrenk ; in its Gloeosporium stage, causing a ripe rot of grapes.

Pleospora herbarum (Pers.) Rab. ; on lettuce.

Corticium centrifugum (Lev.) Bres. ; causing decay, following Scab (*Venturia inaequalis* Aderh.), on apples imported from Canada.

Helicobasidium purpureum (Tul.) Pat. ; in sporulating condition on a partially decayed mangold root, in signally intimate association with its sterile form *Rhizoctonia Crocorum* (Pers.) DC.

Eritrea : Locusts (*Schistocerca gregaria*) (1).

Serious new invasions of locusts were reported in October 1930, for the most part coming from beyond the Abyssinian frontier, particularly from the Avergallè region. The swarms generally flew steadily towards the north-east, crossing the territory of the Seraè and the villages of the Acchelè Guzai which bound it. When the swarms reached the northern part of the plateau they scattered down the numerous valleys cut by streams flowing into the eastern plain towards the Red Sea coast. Some seem to have flown east across the sea.

Two particularly dense swarms were reported on the 22nd and 25th October in the region of Tessenei, having come from the Sudan, these also flew east until they reached the middle valley of the Barca and followed it down towards the Red Sea coast.

It was noted that two swarms, like those coming from Abyssinia, were composed of pink locusts.

No further hatching of hoppers (' cucubtà ') was reported during the month in the Colony ; the control work against those hatched in September was however continued, particularly in the territory of the Commissariat of Cheren. This campaign, in which participated not only the squadrons organised by the Government but the whole native population, gave very favourable results, judging by the fact that of all the swarms reported in Eritrea not one had remained here but all came from Abyssinia or the Sudan.

It is expected that the locusts alighted in the eastern plain will for the most part remain there until they reach sexual maturity when they will copulate and lay eggs which will give rise to the spring generation which heralds the beginning of each annual invasion.

The Office of Agriculture and the Commissariats had already been made responsible for a survey service which should enable any locality with eggs to be detected as well as carrying on the campaign against the adult locusts.

During the first days of November 1930 dense swarms of young pink locusts entered the Colony from the south, crossing the Abyssinian frontier. A single swarm was reported in the north on the 13th, near Carora on the Sudan frontier. This swarm was composed of yellow locusts which began to lay eggs on the 17th. It was immediately determined to plough the land where eggs were found and to

(1) Communication from the Phytopathological Service of the R. Ufficio Agrario of Eritrea, Asmara, transmitted by the Government of the Colony.

inspect the district the swarm had crossed in case of any further deposits of eggs.

Locust swarms coming from beyond the Ethiopian frontier crossed the provinces of the Seraè and the Hamasien in a north-easterly direction towards the eastern plain and more particularly the Red Sea coast. Throughout the whole of the territory in the direction of flight arrangements were made for locating any egg deposits and for killing adults; the latter, though difficult, was very successful in the zones where sufficient labour was available.

During the month natives collected 500 sacks of locusts with a total weight of about 450 quintals. These locusts were buried by the natives in deep pits and later used as manure.

United States of America: Outstanding Entomological Features (1).

The present notes refer to October, 1930.

October developments in the grasshopper situation include defoliation of young citrus in many parts of Florida, serious destruction of new fall plantings of alfalfa and crimson and red clovers in Franklin and Winchester Counties, Tenn., and rather large populations building up in northern Nebraska, western North Dakota, and parts of Iowa.

In addition to the rather heavy infestation of the Middle Atlantic States by the fall armyworm (*Laphygma frugiperda* S. & A.), the insect was quite generally prevalent and in many cases seriously destructive in Ohio, Indiana, Kentucky, Mississippi, and Texas.

A heavy growth of volunteer wheat, in southeastern Nebraska, which is now developed to such a size that it can not be easily destroyed by disking, makes possible a serious infestation of the Hessian fly (*Phytophaga destructor* Say) in wheat next spring in that section. Moderate infestation is also reported from several counties in southern Iowa.

A heavy flight of the chinch bug (*Blissus leucopterus* Say) to hibernation quarters took place in Illinois during early October. Practically all lawns of St. Augustine grass in Fairfax, S. Car., have been seriously injured by this insect.

The corn ear worm (*Heliothis obsoleta* Fab.) is appearing in noticeable numbers in southern New Hampshire the first time since 1922. It is reported as quite prevalent throughout the remainder of the New England and Middle Atlantic States, causing a loss of at least one-third of the corn crop in the intensive truck-growing section of Long Island, N. Y. This heavy infestation extended westward as far as Michigan, Nebraska, Kentucky, and Indiana.

The velvetbean caterpillar (*Anticarsia gemmatilis* Hbn.) though appearing in rather large numbers in parts of Louisiana, is not extending so far westward as it did in the season of 1929.

A scarabeid beetle (*Bolbocerosoma bruneri* D. & McC.) was found early in September damaging golf greens near Lincoln, Nebr., in the same manner as do common white grubs.

Injury by the codling moth (*Carpocapsa pomonella* L.) is being reported as quite generally severe throughout the New England, Middle Atlantic, and South Atlantic States and westward over practically the entire Mississippi Valley Region. In Washington State, however, infestation is said to be much below normal.

(1) Communication from the official correspondent of the Institute, Mr. J. A. Hyslop, Senior Entomologist in Charge, Insect Pest Survey, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

Considerable damage by leafhoppers (Cicadellidae) on deciduous fruits is reported from New England, West Virginia, Georgia, and Indiana.

Following extremely low temperatures last winter in parts of Washington State woolly apple aphid (*Eriosoma lanigerum* Hausm.) infestations were much below normal this year.

The hot summer and mild fall are believed to have been responsible for a very marked increase of the San Jose scale (*Aspidiotus perniciosus* Comst.) population in central and southern Illinois.

The twig girdler (*Oncideres cingulatus* Say) is quite generally prevalent and causing some injury to pecan and English walnuts in parts of Virginia, North Carolina, and South Carolina.

The finding of the walnut husk fly (*Rhagoletis juglandis* Cress.) at the mouth of Cajon Canyon in San Bernardino County, Calif., indicates that this insect extends over a much larger area in southern California than was originally suspected.

The citrus whitefly (*Dialeurodes citri* Ashm.), Florida red scale (*Chrysomphalus ficus* Ashm.), and purple scale (*Lepidosaphes beckii* Newm.) are reported as being more abundant than usual for this season of the year. It is believed that the dry weather has hindered the development of the entomogenous fungi which normally partially control these pests.

A single specimen of the Colorado potato beetle (*Leptinotarsa decemlineata* Say) was collected in Davis County, Utah, this year. This insect has not been observed in Utah for several years.

The potato tuber worm (*Phthorimaea operculella* Zell.) is much more prevalent on the Department of Agriculture's farm at Arlington, Va., than it has been for the past two years. Specimens of this insect were also received in potato tubers from Frederick County, Md., this year.

The Southern green stink bug (*Nezara viridula* L.) is reported as being very effectively controlled by the parasite *Trichopoda pennipes* Fab. in Florida.

The cabbage looper (*Autographa brassicae* Riley) was unusually prevalent in the Norfolk section of Virginia, southern Illinois, the whole of Mississippi, and parts of Texas.

The Mexican bean beetle (*Epilachna corrupta* Muls.) is quite generally reported as either absent from fields or decidedly reduced throughout the New England, and Middle Atlantic region. No reports of damage by this insect were received during the month of October.

A very unusual type of injury was observed in September in the Norfolk section of Virginia. A small black burrower bug (*Pangaeus uhleri* Sign.) was attacking new sprouted spinach, killing the young plants before they pushed through the soil. They were so numerous in one field that 43 acres had to be resown.

Thousands of acres of Douglas fir have been killed in the Colville National Forest in Washington State by the Douglas fir tussock moth (*Hemerocampa pseudotsugata* McD.). The serious outbreaks of this insect in central Idaho now seem to be controlled by parasites.

The mountain pine beetle (*Dendroctonus monticolae* Hopk.) is causing serious damage on both the east and west side of the Cascade Range in Washington State.

What is believed to be one of the largest outbreaks of the southern pine beetle (*Dendroctonus frontalis* Zimm.) is reported from the Smoky Mountain National Park in North Carolina and Tennessee.

The squash bug (*Anasa tristis* DeG.) is reported from Payette and Gem Counties, Idaho.

The fifth case of infestation of cedar trees by the larvae of the moth (*Tortrix*

cockerellana Kearf.) that has come to the attention of the entomologists of Nebraska was reported this year from Frontier County. The insect has been known to occur in the State for the past four years.

The finding of *Cleonus piger* Scop. in Yates County, N. Y. again this year seems to indicate that this European pest is established in that State. In Europe the pest is known as a sugar-beet insect.

India: Infection of *Setaria italica* by *Sclerospora graminicola* on Green Foxtail and Everglade Millet (1).

In our studies on the cross-inoculation of different hosts of *Sclerospora graminicola*, it has been possible to secure as high as 70 per cent. infection of *Setaria italica* by oospores of *Sclerospora graminicola* on *Setaria viridis* and *Setaria magna*.

India: A New Host of *Sclerospora graminicola* var. *andropogonis-sorghi* (1).

Sclerospora graminicola var. *andropogonis-sorghi*, which causes shredding of jowar (sorghum) in the Bombay Presidency, has also been found to infect maize naturally. Artificial infection of maize was secured by the oospores of *S. graminicola* var. *andropogonis-sorghi*, when placed on the seed in the soil. The biometrical dimensions of the conidia of the fungus collected from sorghum and maize, were exactly similar.

India: Downy Mildew of the Grape in the Bombay Presidency (1).

Downy mildew of the grape, caused by *Plasmopara viticola*, made its appearance in an epidemic form in the monsoon of 1929. The season was sub-normal and was preceded by a cold wave in the month of February resulting in a very severe damage to the grape vines which had consequently to be pruned out very early.

Switzerland: Potato Wart Disease in German Switzerland in 1929 and 1930 (2).

The new outbreak in 1929 of potato wart disease (*Synchytrium endobioticum* [Schilb.] Perc.) at Root, Canton of Lucerne, was connected with the 1925 outbreak. The land infected in 1925 was put down to grass for 4 years, was then sold and ploughed and again put down to potatoes, which became infected with the disease by resting sporangia in the soil.

Two further centres of infection were reported in 1929, one at Tägerschen, Canton of Thurgovie, the other at Kaltbrunn, Canton of St. Gall. They were isolated centres on two small plots of land already infected the previous year. The

(1) Communication from the official correspondent of the Institute, Dr. B. N. Uppal, Plant Pathologist to Government, Bombay Presidency, Poona.

(2) Communication from the official correspondent of the Institute, Dr. E. Neuweiler, Eidgenössische Landwirtschaftliche Versuchsstation, Oerlikon-Zürich.

occurrence of wart disease was also detected in the district of Lustenauer-Riet, Vorarlberg, which forms part of the Commune of Widnau, Canton of St. Gall.

In 1930 the only outbreak of wart disease was at Marbach, Canton of St. Gall. The necessary measures (cooking potatoes, disinfecting storehouses, land and implements, sowing the land with grass) were taken to eliminate the centres of infection and prevent the spread of the disease.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Western Australia. — On 7 November 1930 (Agric. No. 2070 25 ; Ex. Co. No. 2522) the Director of Agriculture has notified that Cape Tulip (*Homeria collina*) has been declared a noxious weed under " The Noxious Weed Act, 1924 ", within the boundaries of the Wagin Municipality. (*Government Gazette of Western Australia*, Perth, November 14, 1930, No. 55, p. 2521).

Brazil. — By a ' resolução ' of 20 September 1930 the exportation of banana plants by land or sea from the State of São Paulo is prohibited. (*Boletim do Ministerio da Agricultura, Industria e Commercio*, Rio de Janeiro, 1930, anno XIX, vol. II, n. 3, pag. 351).

Cuba. — In consequence of its having been proved that the Mediterranean fruit fly (' mosca del Mediterráneo ', *Ceratitis capitata*) has been completely stamped out in Florida, by ' resolución ' of 19 November 1930 all the decrees and ' resoluciones ' promulgated in the Republic of Cuba to prevent the introduction of the fruit fly from Florida have been repealed.

The regulations remain in force however by which all holds and refrigerator chambers containing raw fruit on ships coming from Jamaica, the Bermudas, Mexico, Central and South America, Porto Rico, the Hawaiian Islands, Australia, the Philippines, Spain, France and Italy must remain sealed while in Cuban ports. (*Revista de Agricultura, Comercio y Trabajo*, Publicación oficial, órgano de la Secretaría de Agricultura, Comercio y Trabajo, Habana, Cuba, enero de 1931, año XII, vol. II, núm. 18, págs. 71 a 72).

Straits Settlements. — By Notification No. 859 published on the 2 May 1930 the Governor has emended the Pests Notification Rule, 1925 which were published as Notification No. 759 on the 1 May 1925, by adding to Clause 1 of the Schedule a new paragraph (*d*) as follows :—

Name of Pest	Period within which notice to be given.
" (*d*) Secondary leaf fall of Hevea caused by *Oidium Heveae*, Steinm., a disease of the leaves..	Within fourteen days of first finding pest ".

(*Rubber Research Institute in Malaya. Quarterly Journal*, Kuala Lumpur, 1930, Vol. 2, No. 2, p. 68).

Federated Malay States. – By Notification No. 3129 published on the 9 May 1930 the Chief Secretary to Government has amended the Pests Notification Rule, 1927 which was published on the 11 February 1927, by the addition to the Schedule of the following :—

Name of Pest	Period within which notice to be given
(1) Pests of Rubber.	
(*d*) Secondary leaf fall of Hevea caused by *Oidium Heveae*, Steinm., a disease of the leaves.	Within fourteen days of first finding pest.

(*Rubber Research Institute in Malaya. Quarterly Journal*, Kuala Lumpur, 1930, Vol. 2, No. 2, p. 68).

France. — By Decree of 26 November 1930 the entry into France of plants and parts of plants belonging to the genera *Abies*, *Picea*, *Pinus*, *Pseudotsuga* and *Tsuga* is prohibited as being liable to introduce *Rhabdocline Pseudotsugae*.

The introduction into French territory of plants and parts of plants belonging to genera other than those specified above is allowed on condition that (1) each consignment is accompanied by an official sanitary certificate stating that the packages contain no plants or parts of plants belonging to the above mentioned genera and that the goods consigned and the plantations from which they originate have been inspected and found free from *Rh. Pseudotsugae* ; it shall also state the name of the species consigned and the locality in which the plants were grown— (2) the name of the species consigned must be indicated on the packages. (MINISTÈRE DE L'AGRICULTURE. DIRECTION DE L'AGRICULTURE. *Bulletin de l'Office de Renseignements Agricoles*, Paris, 1er décembre 1930, année 1930, nº 23, p. 401-402).

Italy. — By Ministerial Decrees of 22 November 1930 the Communes of Mondovi in the province of Cuneo and Guardialfiera in the province of Campobasso have been declared infected with grape phylloxera. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 4 dicembre 1930, anno 71º, n. 282, p. 5213).

*** By Ministerial Decree of 16 December 1930 the facilities conceded to denaturated glucose have been made applicable to the manufacture of poison baits for insecticidal purposes. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 24 dicembre 1930, anno 71º, n. 298, p. 5571).

*** By virtue of the Law No. 9 of 8 January 1931 the regulations contained in articles 3 and 4 of Royal Decree No. 3071 of 31 December 1923 relating to the revision of the land tax on citrus plantations affected with root rot ('marciume radicale') are extended to citrus plantations damaged or destroyed by the 'mal secco'. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 21 gennaio 1931, anno 72º, nº 16, p. 284).

*** The Ministry of Agriculture and Forests has given permission for the exportation of American vine cuttings from Sicily without permit or disinfection ; for rooted cuttings disinfection remains obligatory.

*** The Ministry of Agriculture and Forests has prohibited the catching of moles — the principal natural enemy of the mole cricket — in the provinces of Verona, Vicenza, Treviso, Brescia and Varese and any infringement of the law will be punishable by a fine of from 100 to 1000 liras.

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DISCOVERIES AND CURRENT EVENTS *

Belgium : Short Account of Crop Disease Conditions in 1930 (1).

Cereals. Yellow rust of wheat (*Puccinia glumarum* f. sp. *Tritici*) was relatively abundant.

For some years a steady increase has been observed in smut on winter barley, *Ustilago nuda* and *Ust. Hordei* being equally abundant. Intermediate forms between the two species have also been observed and are now under study.

Potatoes. The situation as regards wart disease (*Synchytrium endobioticum*) remains unchanged.

Phytophthora infestans was abundant and caused serious loss.

From an enquiry on degeneration diseases it appears that mild mosaic and leaf roll are the most frequent affections of this type in Belgium. Rugose mosaic and streak are much less frequent.

Beets. Yellowing was frequent, as many as 30 % of the plants sometimes being affected ; mosaic on the other hand was scarce (max. 3 %) ; both made their appearance late.

Flax. The part played by *Asterocystis radicis* in the scorch of flax having been disputed the study of this disease, which was fairly frequent in 1930, was taken up again. In all the specimens examined, which came from Flanders, the presence of the *Asterocystis* was ascertained, while species of *Pythium* were always absent. These observations seem to show that flax scorch is a pathological condition which may be caused by various root parasites in different regions (Belgium, *Asterocystis radicis* ; Holland, *Pythium megalocanthum*, etc.).

Tobacco. A bacterial disease very similar to the American wild fire was observed in the valley of the Semois.

Chicory. A mosaic of the nature of the virus diseases was observed in the Gembloux district.

Rose. Several cases of serious infection of rose plants with *Armillaria mellea* were observed.

Tree and bush fruits. There were various records of infection of apple trees by *Armillaria mellea*, of pear trees by *Phacidiella discolor* and of plum trees by *Verticillium albo-atrum*.

A curious affection of gooseberries was caused by a fungus that I connect with *Corticium concentricum*.

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* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Communication from the official correspondent of the Institute, Prof. Em. MARCHAL, Director of the State Phytopathological Station at Gembloux.

Forest trees. There was a renewed outbreak of the canker of the Canadian poplar in various parts of the country. This disease is probably identical with that which is raging in Northern France. A study of the disease has been undertaken again.

Eritrea: Locusts (*Schistocerca gregaria*) (1).

On December 8, 11 and 14, 1930, eggs were reported in the vicinity of Mersa Fatma and Mersa Deresa; these eggs were attributed to a dense swarm of yellow locusts which was recorded on December 5 near the northern boundary of the Colony coming from the Sudan and flying towards the Red Sea coast, where are situated Mersa Fatma and Mersa Deresa. Rahib, which is further inland, is on the direction of flight.

Towards the end of the month the first hatching of ' cucubtà ' (hoppers) being reported from the same places the necessary measures were taken for the destruction of these breeding centres.

Another swarm was reported on the 23rd in the north of the Colony, south of Alghena, flying north- north-east ; it appears that these locusts belonged to the swarms reported on the 5th.

Swarms of varying importance were reported on December 9, 10, 11, 14 and 17 near M. Uorche (north of Cheren), M. Urug (south of the Alighede valley), M. Sabar (south of Gheleb), Debrasina and Barresa. All these swarms consisted of yellow locusts and were flying towards the sea.

In case of possible laying of eggs an active look out is being kept over the whole of the eastern plain.

India : New Diseases reported during the Year 1930 (2).

Pusa (Reported by Dr. W. McRae, Imperial Mycologist, Imperial Institute of Agricultural Research) :—

Triticum vulgare. A new species of *Tilletia* was discovered on certain hybrid wheats in Punjab and named *T. indica* n. sp. by Dr. M. Mitra. A description will appear soon.

Saccharum officinarum. *Sclerospora sacchari* has been recorded for the first time in India on Co. 316 grown in Pusa.

Zea Mays. *Botryodiplodia theobromae* Pat. causing cob rot in storage.

Cajanus indicus. A new species of *Cercospora*. *Colletotrichum cajani* Rangel = *Glomerella cingulata* (produces ascigerous stage in culture).

Sorghum vulgare. *Helminthosporium maydis*.

Cicer arietinum. A species of *Sclerotium*.

Capsicum annuum. Wilt caused by a *Fusarium*.

Bombay Presidency (Reported by Dr. B. N. Uppal, Plant Pathologist) :—

Cotton. *Alternaria macrospora*.

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(1) Communication from the Servizio Fitopatologico dell'Ufficio Agrario of Eritrea, transmitted by the Government of the Colony.

(2) Communication from the official correspondent of the Institute, Mr. W. McRae, M. A., D. Sc., F. L. S., Imperial Mycologist, Imperial Institute of Agricultural Research, Pusa, India.

Citrus. *Rosellinia* sp.

Dolichos biflorus. Mosaic disease.

Control measures. Three applications of 200-mesh fine sulphur have given very effective control of powdery mildew and mango jassid hoppers, of which three species are found in the Bombay Presidency (*Idiocerus nivcosparus, I. clypealis* and *I. atkinsoni*). Sulphur acts as a preventive and curative against powdery mildew, and as deterrent against hoppers. The cost of treatment does not exceed Rs. 1/- per tree and results in a net profit of about Rs. 7/- per tree.

Very effective control of fig rust, *Uredo fici*, has been secured by sulphur dusting.

Dharwar (Reported by Dr. B. B. Mundkur, Cotton Mycologist) :—

Arachis hypogaea. Rosette, a virus disease.

Capsicum annuum. Fusarium wilt.

Madras Presidency (Reported by Mr. S. Sundararaman, Government Mycologist) :—

Oryza sativa. Fusarium sp. causing foot rot.

Aristolochia bracteata. Colletotrichum sp.

Bengal (Reported by Mr. G. P. Hector, Economic Botanist) :—

Hibiscus Sabdariffa var. *altissima. Phytophthora* sp.

India : Two Injurious Insects recently appeared in the Punjab (1).

Alcides porrectirostis, Mshl. (Curculionidae : Coleoptera) has been recorded in the Punjab doing enormous damage to walnut fruit. The weevils lay their eggs in the young fruit and the grubs bore into it and pupate inside the fruit. The attacked fruit drops. In some cases not a single fruit remains on the tree.

Bemisia gossypiperda, Misra & Lamba (Aleurodidae : Hemiptera) has been attacking cottons for the past few years. The eggs are laid mostly on the under side of leaves and the nymphs mainly confine themselves to the underside also. The life-cycle during April to September is 14-27 days, during October-November 36 days and November to February 97-107 days ; there are a number of broods on cottons. This pest has numerous alternative food plants. It is interesting to note that the attacked leaves do not show any malformation such as drying, wrinkling or curling.

Latvia: Plant Diseases observed in 1930 (2).

Crop diseases have not appeared in epidemic form during 1930. It should be mentioned that the destruction of barberry and buckthorn prescribed by the law of 20 March 1930 (cf. this *Bulletin*, 1930, No. 8, p. 126) has been started on a large scale. To encourage the control of *Fusarium* on rye considerable quantities of fungicides have been distributed at State expense.

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(1) Communication from the official correspondent of the Institute, Mr. M. Afzal Husain, M. A. (Cantab.), I. A. S., Locust Research Entomologist to the Imperial Council of Agricultural Research Punjab Agricultural College, Lyallpur.

(2) Communication from the official correspondent of the Institute, Prof. Max Eglits, Phytopathological Laboratory of the University, Riga.

In several districts *Cladosporium herbarum* (Pers.) Lk. attacked winter wheat. Serious damage has been caused to *Ribes* spp. by *Puccinia ribesii caricis* Kleb. and to chrysanthemums under glass by *Oidium chrysanthemi* Rabenh. *Cladosporium fulvum* Cooke, which attacks tomatoes under glass, is gradually spreading.

In the autumn of 1930 the presence of bunt of wheat (*Tilletia laevis* Kühn) was reportd for the first time in this country. It seems as though the disease was introduced in 1929 with the seed wheat which had to be imported in consequence of the bad crop of 1928.

The following fungi must be reported as new to the flora of Latvia :— *Uropyxis sanguinea* Arth. on *Mahonia Aquifolium* Nutt. at Riga ; *Diplodina Lini* Moesz and Smarods on flax in the district of Walk ; *Ramularia Coriandri* Moesz and Smarods on *Coriandrum* spp. in the gardens of the horticultural firms of Riga ; *Exobasidium discoideum* Ell. on *Azalea* sp. under glass ; *Physalospora Cydoniae* Arn. on *Pyrus Malus* L. and *P. communis* L. in the nursery gardens.

Hellenic Republic : Outbreak of *Heliothis armigera* Caterpillars on Crops in Macedonia (1).

Cotton plantations in the communes of Arapli, Doudoular and Epanomi in the Salonica region were infested in 1930 by caterpillars of *Heliothis armigera* Hbn. which destroyed nearly the whole crop. The plantations of the Communes of Arapli and Doudoular cover an area of 400 hectares, 200 of which are irrigated ; those of Epanomi cover 500 hectares and are not irrigated.

The caterpillars damaged also the crops of maize, tomatoes, egg plant, piments and French beans in these Communes. They also caused losses estimated at 25-60 per cent. of the crop in cotton plantations in the region of Véria, Macedonia.

The caterpillar attacks maize by preference and then cotton. In regions where maize fields were interspersed among the cotton plantations the latter were very little attacked, while the cobs of the early varieties of maize were completely destroyed.

The caterpillars when young feed on the leaves of the cotton plant ; later they attack the flower buds and young bolls, which they leave just before they fall to carry on their destructive activities elsewhere.

In a cotton plantation near the railway station at Naoussa no caterpillars were found, although they were present in nearby small plots of maize, tomatoes and tobacco.

Larks literally decimated the caterpillars. In one cotton plantation which was visited by a flock of larks not one caterpillar survived ; in a neighbouring plantation which was not visited by larks the number of caterpillars was not diminished.

As a result of these observations the following measures seem indicated in order to reduce the damage of this pest. Early maize should be grown in cotton plantations as a trap plant. Cotton plantations should be sprayed or dusted with arsenical insecticides very early when the caterpillars are scarcely visible and are feeding on the leaves, before they penetrate into the bolls. Birds, and particularly larks, must be protected.

The above observations were made by the Inspector of Agriculture at Salonica and the Agricultural Servce at Vermion, Macedonia.

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(1) Communication from the official correspondent of the Institute, Mr. C. A. Issaakides, Technical Advisor to the Minister of Agriculture, Athens.

Hellenic Republic : Control of Field Voles (1).

In 1930 in several of the wheat growing plains of the Hellenic Republic field voles increased to such an extent that they became a menace to the cereals and potato crops.

Amongst the regions particularly infested may be mentioned Langada and Katerini in Macedonia, the plains of Thessaly, Phthiotis and Phocis, the vicinity of Thebes, several districts in the Departments of Arcadia and Messenia, in the Peloponnesus and the island of Euboea, and the Department of Candia in Crete.

The rainfall last autumn was not abundant, which was the principal factor favoring the multiplication of the voles.

The campaign against them in the Hellenic Republic was carried on mainly with the use of oats and rye grain poisoned with nitrate of strychnine. The poisoned bait was prepared by soaking 1000 kilos of grain in a solution of 12.5 kilos of nitrate of strychnine until the liquid was completely absorbed by the grain.

The Phytopathological Service of the Ministry of Agriculture supplies the poisoned grain free. Producers in the infested regions are obliged to conform to Law No. 512 relating to the control of voles and locusts. The Phytopathological Service has already distributed about 25 tons of poisoned grain and expects to supply a further 75 tons.

The poisoned grain is an effective and economical means of control in winter when grass is scarce. About 10 grains are thrown into each vole hole.

The Phytopathological Service uses other control methods in addition to poisoned grain. The Danysz virus, prepared in the Microbiological Laboratory of the Ministry of Agriculture, is utilised in particular.

It also procures ' Delicia ' and ' Hora ' fuses (German products) which when lighted produce a heavy asphyxiating smoke. A fuse is inserted in the top of a metal cylinder which is introduced into the mouth of a vole run. When the smoke begins to emerge from neighbouring holes they are all stopped up, and the voles within are thus asphyxiated. One fuse is sufficient for several runs. The Phytopathological Service procured 250 cylinders and 25,000 ' Delicia ' fuses and as many ' Hora ' fuses and cylinders.

This method is more costly than the poisoned grain method, but has the advantage of being effective in all seasons, in particular in spring when voles are more attracted by the young grass than by the poisoned grain.

Turkey : Natural Enemies of the Desert and Italian Locusts (2).

During the last anti-locust campaign the directors of the control operations observed that a fly (*Stomatorrhina lunata*) was abundant in the breeding grounds of the Desert locust (*Schistocerca gregaria*). Thousands of small larvae were found in the soil with the locust eggs. This insect destroyed in certain regions as many as 50 and even 75 % of the eggs.

The Italian locust (*Calliptamus italicus*) is the most widely spread locust species in Turkey. It is a pest on various crops in certain years. During rainy years

(1) Communication from the official correspondent of the Institute, Mr. C. A. Issaakides, Technical Advisor to the Minister of Agriculture, Athens.

(2) Communication from the official correspondent of the Institute, Mr. M. Sureya, Councillor of State, Angora.

the fungus *Empusa Grylli* appears and parasitises the locusts. Last year, for example, at Samsoun this fungus decimated the swarms so that the region was completely rid of locusts.

In 1930 in the province of Ismit after the abundant rains of May and June the locusts were attacked by the disease and were wiped out within a few days.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany (1). — An Ordinance of 30 September 1930 establishes the new list of custom houses by which, in so far as it is permitted, potatoes may be imported.

*** The names of the Bureaux of the German Plant Protection Service and the officials authorised to issue phytopathological certificates for exportation of plants and in particular of potatoes are given in two annexes to No. 12(1930) of the *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst.*

*** An Ordinance of 22 September 1930 concerning the control of the potato eelworm (*Heterodera schachtii* f. *solani* called also *H. rostochiensis*) in Thuringia enacts that any outbreak or suspected outbreak of infection with this eelworm must be immediately reported to the local authorities who on their part shall notify the higher authority and the Plant Protection Station at Jena. Land shall be declared infected on which the potato eelworm has been found ; neighbouring land shall be declared " in danger ". Potatoes grown on land infected or " in danger " may not be used as seed. Potatoes must be cooked before being used for food. Potatoes may not be exported beyond the boundaries of the Communes in which the potato eelworm has been found to be present.

Cellars and other places in which potatoes coming from infected land have been stored must be thoroughly cleaned and disinfected with a soapy solution of 2 % cresyl. All remains of potato plants in districts which are infected or " in danger " must be collected and burnt ; it is particularly forbidden to throw them on compost or manure heaps.

During 5 years after the ascertaining of infection land which is infected or " in danger " may not be planted with potatoes, tomatoes or other plants liable to be attacked by the potato eelworm.

*** By virtue of the Police Ordinance of 4 October 1930 for the control of asparagus rust [*Puccinia Asparagi*] in Thuringia any person growing asparagus is obliged before the beginning of October in each year to cut and burn all green shoots of asparagus. As soon as the first symptoms of the disease appear in spring (May and June) affected stems shall also be cut and burnt.

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(1) Communication from the Biologische Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, official correspondent of the Institute.

Western Australia. — On the 17 December 1930 (Agric. No. 2070/25; Ex. Co. No. 2868) the Director of Agriculture notified that Cape Tulip (*Homeria collina*) has been declared a noxious weed under "The Noxious Weeds Act, 1924" within the boundaries of the Goomalling Road Board. (*Government Gazette of Western Australia*, Perth, December 19, 1930, No. 60, p. 2701).

Belgian Congo. — By Ordinance No. 1 of 10 January 1931 the Governor of the province of Katanga has established that any seeds, tubers, or plants for importation into the province must be covered by a certificate, issued by the official authorities of the country of origin, declaring the seeds, tubers or plants free from cryptogamic or entomological diseases.

Seeds, tubers or plants found to be infected with cryptogamic or other disease will be dealt with at the importers' expense and, if necessary, destroyed.

Any person warehousing or transporting seeds, tubers or plants must if they are infected with parasitic or other diseases immediately notify the Administration.

Any person who has warehoused or transported seeds, tubers, or plants known to be infected must arrange for the disinfection of the premises used for their storage or of the waggons, vessels or barges used for their transport. The method of disinfection may be decided by the Administration.

Any infringement of this Ordinance will be punishable by a penal servitude not exceeding two months in duration and by a fine not exceeding 2000 francs, or by one of these penalties. (*Agriculture et Elevage au Congo Belge*, Ixelles, 1931, 5ème année, nº 4, p. 42).

Cuba. — By Presidential Decree No. 8375 of 16 October 1930 the Minister of Agriculture, Commerce and Works has been authorised to nominate, on the recommendation of the Academy of Medical, Physical and Natural Sciences, a Committee of five experts who shall judge entries in competition for the international prize of 30,000 dollars established by Law on 13 December 1910. The prize will be awarded to the competitor who not only shall have discovered the cause of the disease which is killing the coconut palms in the island but shall have prescribed remedial and preventive measures against the disease. (*Revista de Agricultura, Comercio y Trabajo*, Publicación mensual, órgano oficial de la Secretaría de Agricultura, Comercio y Trabajo, Habana, Cuba, 1930, año XII, vol. II, núm. 17, págs. 48 a 49).

Eritrea. — The following is the list of the plant diseases and pests against which Eritrea more particularly desires to protect herself in accordance with Art. 11 of the International Convention for Plant Protection (Rome, 16 April 1929) (cf. this *Bulletin*, Year III, 1929, No. 4, pp. 52-53).

The plants, plant parts and seeds specified in this list may not be imported unless accompanied by a phytopathological certificate of the Official Plant Protection Services of the countries of origin adhering to the International Convention of Rome (16 April 1929) and certifying immunity from diseases and pests in general and in particular from those named below :—

Durrha seed	*Sphacelotheca Sorghi.*
Stems and panicles of durrha . . .	Caterpillars of the stems and panicles.
Barley seed	*Ustilago Hordei.* *Ust. nuda.*

Wheat seed	*Ust. Tritici.*
Cotton seed	*Platyedra gossypiella.* *Anthonomus grandis.*
Maize seed	*Ust. Maydis.*
Maize stalks and heads	Caterpillars of the stalks and heads.
Potatoes	*Epitrix cucumeris.* *Doryphora (Leptinotarsa) decemlineata.* *Phthorimaea operculella.* *Actinomyces Scabies.* *Phytophthora infestans.* *Synchytrium endobioticum.*
Onions	*Urocystis Cepulae.*
Seeds of fodder plants	Dodder.
Citrus fruits.	*Lepidosaphes gloverii.* *Aleyrodes citri.* *Bacterium Citri.* *Corticium salmonicolor.* *Sphaeropsis tumefaciens.* *Gloeosporium limetticolum.*
Any fresh fruit	*Aonidiella perniciosa.* *Laspeyresia molesta.* *Diaporthe perniciosa.*
Plants and fruits of pineapple	*Thielaviopsis paradoxa.* *Fusarium cubense.*

(*Bollettino Ufficiale della Colonia Eritrea*, Asmara, 31 gennaio 1931, anno XL, n. 2, p. 68).

Italy. — In consequence of the serious damage caused by the European corn borer (*Pyrausta nubilalis* Hübn.) to maize crops in the provinces of Udine, Treviso, Venice, Padua, Rovigo and Ferrara a Ministerial Decree of 20 January 1931 enacts that farmers and owners of land under maize in the provinces mentioned shall before 15 April of every year provide for the use as litter of all maize stalks and for their removal to manure pits ; they may also use them as fuel or fodder or cause their disappearance in any other way provided that the destruction of the caterpillars of the corn borer is guaranteed. This applies to stalks already cut and stacked as well as to those still standing.

The stalks must be either pulled up or cut at or even below the level of the soil, in such a way that no trace remains visible. Only in exceptional cases and on the recommendation of the Director of the Regional Phytopathological Observatory may the stalks be ploughed in.

Maize stalks which after 15 April of each year shall not have been destroyed or utilised by one of the methods mentioned above shall be immediately burnt if they

are already cut and stacked, or cut at or below soil level and then burnt, at the expense of the defaulter, who shall be punishable under the regulations in force.

The exportation of maize stalks from the provinces mentioned is prohibited (1).

*** The Ministry of Agriculture and Forests has published a list of the Communes declared to be infected with, or suspected of infection with, grape phylloxera up to 31 December 1930, from whose territory the exportation of certain plant products is prohibited in coformity with Law No. 94 of 3 January 1929 (see this *Bulletin*, Year III, 1929, No. 2, pp. 22-28). (*Bollettino Ufficiale del Ministero dell'Agricoltura e delle Foreste*, Roma, 1° febbraio 1931, anno III, n. 3, pp. 307-335).

Peru. — Since the West Indian fruit-fly (' mosca de la fruta ', *Anastrepha fraterculus*) is apparently absent from the valleys of Moquegua, Locumba, Sama and Tarata, by ' resolución ' of 1 December 1930 the importation by the port of Ilo into these localities of oranges, cherimoyer and other fruits from the valley of Azapa, Chile, and of mangoes, oranges and cherimoyer fruits from the different valleys of the country is prohibited.

The export of fruits and vegetables produced in the valley of Tacna and intended for Moquegua, Locumba, Sama and Tarata is allowed on condition that they are inspected by the Agronomic Station of Tacna, which will in each case issue the necessary sanitary certificate free of charge.

The exportation of peaches, quinces, pears, apples, guavas, tomatoes, aubergines, gourds and garlic capable of carrying the insect mentioned above is prohibited. (*La Vida Agrícola*, Lima, (Perú), 1931, vol. VIII, no. 86, págs. 79 a 80).

*** In order to defray the expense occasioned by the control of the West Indian fruit-fly in the valley of Tacna a ' resolución ' of 1 December 1930 has authorised the Agronomic Station of Tacna to levy on all exporters of fruits and vegetables produced in the valley a tax of 2 gold ' soles ' (S/o 2.00) per ton of inspected merchandise as dues for the issue of the requisite official sanitary certificates. (*Ibid.*, pág. 80).

*** In consequence of the absence of the Mediterranean fruit fly (' mosca de la fruta del Mediterráneo, ' *Ceratitis capitata*) from Mexico, by ' resolución ' of 11 December 1930 Art. 1 of the ' resolución suprema ' of 2 August 1929 has been modified in such a way that the importation into Peru of fresh fruits and vegetables from the United States of America (except the States of California,Oregon and Washington), Central America, the West Indies, the Bermudas and the Hawaiian Islands alone remains prohibited. (*Ibid.*, pág. 80).

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Prof. Alessandro Brizi, *Segretario generale dell'Istituto, Direttore responsabile.*

DISCOVERIES AND CURRENT EVENTS *

South Australia : Notes on Plant Pests during 1930 (1).

Heterodera schachtii Schm. was prevalent in some districts during the winter months on oats, wheat and barley.

Penthaleus destructor Jack (*Halodytaeus destructor* Tucker) has been observed in small numbers in a few districts in the State on garden plants but has not occurred in an epidemic form. It favours chick weed, *Stellaria media* and cape weed, *Cryptostemma calendulaceum*.

'White grubs' of undetermined species have been troublesome on pasture areas in the South-East areas of the State.

Sminthurus viridis Linn. has been troublesome in certain districts on lucerne and Subterranean clover, but in certain other districts not so serious as is the case in some years.

Capitophorus fragariae Theob. was recorded on strawberries, this being the first record for South Australia. The colonies disappeared with the approach of the warmer spring weather.

Eritrea: Locusts (*Schistocerca gregaria*) (2).

During the first ten days of January 1931 locust eggs were deposited in the vicinity of the village of Addis Addí, of Abut, Gamà and Ogdalò in the Agambussa. Hatching of hoppers ('cucubtà') continued meanwhile at Zula, along the Genfailè stream and in the Car, and at Mersa Taclai in the eastern plain.

A dense swarm of young locusts coming from the north-east was reported from the residence of northern Dancalia on 19 January. On 20 January the same swarm was observed over the peninsula of Bari flying towards Arafali.

On the 23rd a number of pink locusts coming from over the Abyssinian frontier flew over the zone of Gharre Uoddi to the north-west of Assab.

Although throughout the territory to the south of Massaua all the hoppers reported up to last month were killed by emergency control gangs, to the north there

* In this, as in the next two chapters, the countries are arranged in French alphabetical order,

(1) Communication from the official correspondent of the International Institute of Agriculture. Dr. James Davidson, Entomologist, Waite Agricultural Research Institute, Glen Osmond, South Australia.

(2) Communication from the official correspondent of the Institute, Dr. A. De Benedictis, Capo dell'Ufficio Agrario della Colonia Eritrea, Asmara.

exist some breeding places, but as they have already been located they will be destroyed without delay.

United States of America: Outstanding Entomological Features (1).

The present notes refer to the period January and February, 1931.

During the very warm weather of late January and early February, reports were received from Missouri and South Dakota of emergence of grasshoppers (Acrididae). It was at first believed that this was precocious hatching, but later evidence seems to indicate that it was merely the emergence from hibernation of such species of grasshoppers as spend the winter in the early nymphal stages.

This same warm weather resulted in reports of the appearance of cutworms (Noctuidae) in Missouri, and we also have a report of damage to strawberry buds by cutworms late in February on Bainbridge Island in Washington State.

An interesting observation of the successful hibernation of the pupae of the corn ear worm (*Heliothis obsoleta* Fab.) at Columbia, Mo., has been received. These pupae were alive when the report was made, in the last week of February.

The sugarcane borer (*Diatraea saccharalis* Fab.) appears to have passed the winter in very good condition in Louisiana, though the population that entered hibernation is reported as having been small.

Eggs of the rosy apple aphid (*Anuraphis roseus* Baker) seem to be prevalent enough in Pennsylvania to indicate trouble, while in southern Virginia they are so scarce that the entomologists are recommending omitting the aphid treatment in early sprays.

The San Jose scale (*Aspidiotus perniciosus* Comst.) still seems to be on the increase along the Atlantic seaboard from Pennsylvania to Georgia and westward over the Gulf region.

Reports of very successful hibernation of the codling moth (*Carpocapsa pomonella* L.) have been received from the New England, Middle Atlantic, South Atlantic, and the southern part of the East Central States.

The vegetable weevil (*Listroderes obliquus* Gyll.) has been reported from practically the entire infested territory as affecting winter truck crops.

The spotted cucumber beetle (*Diabrotica duodecimpunctata* Fab.) is reported as doing more or less damage in the Gulf region. This condition, however, is not unusual. The banded cucumber beetle (*Diabrotica balteata* Lec.) is reported as quite generally distributed over Florida. Although known for several years from the western part of the State, it is a new pest on the peninsula. The western spotted cucumber beetle (*Diabrotica soror* Lec.) started leaving winter quarters during late January in Oregon.

The asparagus miner (*Agromyza simplex* Loew) is reported for the first time from southern California. It has been known for some time as a pest in the San Joaquin and Sacramento Valleys.

A heavy migration of the turnip aphid (*Rhopalosiphum pseudobrassicae* Davis) was observed in Galveston County, Texas, on February 2.

During the last week in January and the first week in February, the European earwig (*Forficula auricularia* L.) was observed active at several points in Oregon.

(1) Communication from the official correspondent of the Institute, Mr. J. A. Hyslop, Senior Entomologist in Charge, Insect Pest Survey, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

India: Notes on *Thrips tabaci* (*Heliothrips indicus*), a Pest of Onion and Chillies (1).

Thrips on Onion.

(A) Results obtained by cultural methods for the control of Thrips :–

(1) Multiplication of Thrips is proportionate with the growth of the plant and therefore weakness of plants is not a predisposing factor for the rate of increase of Thrips on onion plants. Stimulating the plant by manuring although it does not reduce the number of Thrips, per unit of exposed area, however enables the plants to withstand the attack better.

(2) Excess of nitrogen over other manurial ingredients acts as a predisposing factor for the rate of increase of the insects and the plant itself withstands the attack rather badly.

(3) Since better growth results in better withstanding power, any factors that act as stimulant to the growth of the plants, will impart to the latter greater power to withstand the Thrips attack. Such factors probably are :—

(*a*) Lime — Which reduces the hydrogen ion concentration of our ordinary soil.

(*b*) Complete fertiliser — Taking care that the proportion of nitrogen does not exceed a certain limit. Phosphate appears to be deficient in our ordinary Poona soils in respect to this crop. If superphosphate is used as a source of phosphatic ingredient, then it is advisable to use lime or any basic fertiliser to neutralise the acidity of the former. Application of oil seed cakes which contain a fairly large amount of phosphorus in addition to nitrogen, and farmyard manure are severally or jointly preferable to the application of sodium nitrate alone or in excess in conjunction with farmyard manure.

(*c*) Sterilisation of soil may be practised with good results if economical.

(B) Remedial and preventive measures :—

(1) Application of kerosine oil emulsion (new method) as an insecticidal spray in two doses between 6.30. a. m. to 8.30 a. m. at the interval of 4 to 5 days is the most economical measure found out so far.

(2) Clean cultivation is also an essential factor in suppressing the attack of Thrips which are found on a variety of crops and weeds.

Thrips on Chillies.

Technique of finding ova in the tissues of the leaf :—

Various methods were attempted to locate the eggs inside the oviposition media of chillie leaves but all failed to show the eggs in a convincing manner. Some of the methods that were tried may be enumerated as (1) Holding the leaves against light : Transparent specks were seen but that could not be taken as conclusive proof, (2) Examining the leaf under microscope, (3) Taking microtomic sections of the leaf, (4) Bleaching leaves with free chlorine evolved by the combination of HCl plus calcium hypochloride and subsequently dehydrating and clearing in clove oil, etc.

Finally, however, treatment of Chillie leaves with xylene as a clearing agent has enabled the eggs to be seen in an unmistakable manner. Even the embryo contained in the eggshell is made vividly visible under the microscope. Treat-

(1) Communication from the official correspondent of the Institute, Mr. T. N. Jhaveri, L. Ag., Assistant Professor of Entomology, College of Agriculture, Poona, India.

ment of leaves by xylene method has shown therefore that the eggs are inserted in rather slanting position, generally towards the mid-area of a leaf. Eclosion takes place by a circular opening, not unlike one we find in cyclorhaphous puparium. We can now easily distinguish between hatched or unhatched eggs when seen under microscope. There are found two kinds of transparent spots on chillie leaves, some large and others so small as to be with difficulty discovered with the naked eye. The former are caused by the laceration of leaf tissue by the feeding of Thrips while the latter represent the anterior end of the eggs that are not buried too deeply. It is not possible to distinguish eggs buried more deeply than the epidermis.

Xylene method may be used to spot intro-tissue eggs as well as miners.

VARIOUS QUESTIONS

Locust Conference held in Cairo from January 31st to February 4th, 1931.

The following members took place in this Conference: —Messrs. H. V. King, Government Entomologist, Khartoum, C. Bodkin, Director of Agriculture, Jerusalem, Sobhi Bey el Hassibi, Director of the Locust Bureau, Damascus, Sheikh Fawzan el Sabek, representing Nejd and Hedjaz, E. Ballard, Chief Plant Pathologist, Ministry of Agriculture, Egypt, Kaimakan L. H. C. Hutton Bey, Frontiers District Adm., Egypt, A. M. Mistikawi Eff., Senior Entomologist, Ministry of Agriculture, Egypt, M. S. El Zoheiri Eff., Entomologist, Ministry of Agriculture, Egypt. Dr. A. De Benedictis, Head of R. Ufficio Agrario of Eritrea, apologised.

After careful discussion the Conference agreed unanimously to the following points :—

(1) That in view of the connection which the study of locust movements has established between the Sudan, Eritrea, Arabia, Palestina, Transjordania, Syria, Egypt and Turkey, it is incumbent upon all these countries to prevent locusts breeding throughout their territories. We cannot conceive a better slogan than the one which runs as follows :—

' A dead locust is a good locust, poisoned, burnt, beaten or buried '.

(2) It will be realised that the principles of locust warfare are those of human warfare, in that the best defence is to attack. The protection of the crops of the Nile Delta should not be attempted by awaiting the arrival of locusts in the Delta but by preventing them from breeding anywhere within Egyptian territories *i. e.* by carrying out an extensive campaign against hoppers in Sinai Peninsula and other desert regions where they occur.

(3) The advent of locusts would not be awaited before preparations are made *i. e.* there should always be adequate supplies of materials and apparatus for dealing with a locust invasion in any country where locusts are liable to occur.

(4) It would be a mistake to abandon the biological study in the intervals between locusts years. This work should be continued.

(5) It is most desirable that information should be obtained on the seasonal occurrence of the Desert locust together with meteorological data from Arabia.

(6) About methods of control it was agreed that the cheapest and most effective is the poison bait and should be looked on as the standard method.

A very valuable auxiliary is the metal barrier (whether zinc or tin).

In certain cases and under proper control the flamegun, although expensive in use, is a most valuable weapon for dealing with flying swarms. In special circumstances also the ploughing of egg areas has proved efficacious when carried out immediately after oviposition.

The use of smoke for the protection of valuable crops from flying locusts in restricted areas might be recommended.

Generally speaking the use of aeroplanes is of value for transport of Senior officers when inspecting a large area, and possibly in certain circumstances for collecting information from scouts by means of ground signals.

No opinion on their use for scattering bait can be given until experiments have been carried out but under the conditions obtaining in the desert it is unlikely that they can be used with any degree of economy.

International Diplomatic Conference for the Protection of Birds useful to Agriculture.

The International Institute of Agriculture has for a long time taken an active interest in the question of the protection of birds, and in particular of birds useful to agriculture.

The IInd General Assembly of the Institute (1909) discussed the subject and adopted conclusions to the effect that the Institute should take active steps to approach the Governments with a view to the complete execution and success of the International Convention for the Protection of Birds Useful to Agriculture signed at Paris 19 March 1902, and in general that the Institute should collect information as to the manner in which the said Convention is applied, both from the legislative and technical standpoints.

The question was again considered by the IIIrd General Assembly of the Institute (1911) and should have come before that of 1920. But events at that time scarcely allowed of insistence on the question and things were left as they were, although the Institute for its part continued to amass documentation as regularly as possible.

Since that time, however, the desire has been repeatedly expressed that a general revision of the Paris Convention should be undertaken, such revision becoming, according to experts and interested persons in different countries, of increasing utility.

The International Institute of Agriculture has therefore decided in virtue of the powers conferred by the International Convention of 7 June 1905 to propose to the adhering Governments to call and hold under its auspices an International Diplomatic Conference for the purpose of drawing up a new Convention, modifying and completing where necessary the Paris Convention now in force.

The date of the Conference has been fixed for October 1931. It will take place in the Netherlands the Government of the Netherlands being willing to give hospitality to the Conference.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

French Colonies. - - By Ministerial Decree of 1 December 1930 Art. 6 of the Ministerial Decree of 22 February 1926, concerning the introduction of cotton seed into the French Colonies by reason of the pink bollworm of cotton [*Platyedra gossypiella*], has been modified as follows :—

' The regulations of the present Ministerial Decree are applicable to the products named in Art. 1 and intended for importation into or transit through any French possession, excepting Madagascar, New Caledonia and Indochina.

' The regulations of Art. 1 of the present Ministerial Decree are applicable to the products named coming from Egypt, British West Africa, the old German East Africa, Nigeria, Sierra Leone, Asia, Brazil, Mexico, the Hawaiian Islands, the British West Indies, the following North American States, — Texas, Louisiana, New Mexico - - Greece, Algeria, Tunisia, Morocco, Madagascar, New Caledonia and Indochina, also from countries in which the importation of such products is not prohibited nor subject to phytopathological control. ' (*Journal Officiel de la République Française*, Paris, 11 décembre 1930, LXII[e] année, nº 290, p. 13562).

Spain. — By ' Real orden ' of 26 November 1930 and on the request of the authorities and the owners of oak plantations in the valley of Los Pedroches (Córdoba), the Director of the Laboratory of the ' Fauna Forestal Española, Piscicultura y Ornitología', D. Manuel Aulló y Costilla, Ingeniero Jefe de Montes, has been made responsible for the organisation, direction and execution of control measures against *Lymantria dispar* L., which spread in 1930 over an area of over 10,000 hectares.

In connection with the control campaign an association of owners of oak plantations has been formed in the commune of Villanueva de Córdoba. This is the first association of the type in Spain. (*Revista de Biología Forestal y Limnología*, Madrid, 1930, año II, serie A, núm. 3, págs. 53 a 55).

France. — By Ministerial Decree of 24 March 1931 the introduction into French territory of coniferous plants or their parts the importation of which is authorised under the conditions prescribed by Ministerial Decree of 26 November (see this *Bulletin*, 1931, No. 2, p. 28) may be effected only by the customs offices of Dunkirk, Tourcoing, Strasbourg (Kehl), Ventimiglia, Marseilles and Bordeaux.

Direct transit without restrictions regarding point of entry of plants and plant parts of any coniferous species is authorised subject to the control measures taken by the customs administration. Packages must be such that no part of their contents can come unpacked in course of transport. (Ministère de l'Agriculture, Direction de l'Agriculture. *Bulletin de l'Office de Renseignements Agricoles*, Paris, 1[er] avril 1931, nº 7, p. 117).

Italy. — A similar compulsory association (' Consorzio obbligatorio ') to that formed in 1929 at Cividale (cf. this *Bulletin*, Year III, 1929, p. 39) has been established, also for a period of nine years, at Maniago among fruit growers (land owners, tenant farmers or ' métayers ') of the communes of Fanna, Maniago, Cavasso Nuovo and Frisanco (province of Udine). The purpose of the association is the control of the following plant and animal pests of fruit trees :— *Nectria ditissima, Carpocapsa pomonella, C. funebrana, Aporia crataegi, Porthesia chrysorrhoea, Hyponomeuta*

malinellus, H. cognatellus, Lyda pyri, L. nemoralis, Fusicladium dendriticum, F. pyrinum, Monilia fructigena, Gnomonia erythrostoma, aphides, *Cossus cossus, Zeuzera pyrina.*

Morocco (French Zone). — By Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation of 19 February 1931, concerning phytosanitary measures, the importation and transit of the products or objects enumerated in Art. 5 of the ' dahir ' of 20 September 1927 (cf. *International Review of Agriculture*, New Series, Year XIX, 1928, p. 571) may take place only by the ports of Casablanca and Kénitra and by the frontier station of Oujda.

The said products or objects are on their entry into the French Zone of the Sherifian Empire submitted to sanitary inspection and, if necessary, are disinfected, fumigated, returned or destroyed.

Plants and plant parts, with the exception of seeds, fruits and vegetables other than potatoes, tomatoes and aubergines, must be accompanied by :—

(1) a list of the botanic species and varieties contained in the consignment, certified in conformity with the trade invoice, specifying (*a*) the name and address of the consignor and of the grower's establishment; (*b*) the name and address of the consignee ; (*c*) whether the grower's establishment is subject to State control ; (*d*) the number, weights, marks and numbers of the packages ; (*e*) the number of plants, if any ;

(2) in the case of the products specified by Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation, a certificate of sanitary inspection conforming to the model annexed to the International Convention for Plant Protection (Rome, 16 April 1929) (cf. this *Bulletin*, 1929, No. 4, pp. 50-55). The said model is annexed to the present Decree.

To allow of the identification of each package there must be attached to each a ticket bearing the following information :—

(1) the full name of the consignor ; (2) the locality, department or province and country of provenance of the contents ; (3) the nature, variety and quantity of the contents ; (4) the name and address of the consignee.

Each package must also bear a clearly visible mark and number.

Vine plants may not exceed 1m.50 in length and must be in bundles of not more than 200.

The entry of plants with soil is authorised only if packed in hermetically closed and sealed bags of impermeable material and with double seams.

Potatoes must be packed in new bags, boxes, barrels or hampers.

The officials of the Direction Générale de l'Agriculture, du Commerce et de la Colonisation responsible for the supervision of the sanitary condition of crops and the inspection of horticultural firms and nurseries are to indicate to the customs authorities the suitable control measures to adopt against plant parasites. These officials will also issue the sanitary certificates which must accompany products or objects intended for export.

The present Decree also establishes the conditions concerning the circulation of products coming from establishments subject or not to sanitary control. Cut flowers, fresh fruits and vegetables and their packing materials, soil, compost, dung and props may be freely circulated.

Exportation outside the French Zone of plants in pots or in soil and plant parts, cuttings, budwood, flower bulbs, tubers and rhizomes, also of cut flowers, requires a certificate of sanitary inspection. (Empire Chérifien. Protectorat

DE LA RÉPUBLIQUE FRANÇAISE AU MAROC. *Bulletin Officiel*, Rabat, 3 avril 1931, XX^e année, nº 962, p. 427-428).

*** By Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation of 19 February 1931, concerning the application of sanitary regulations to certain products of plant origin on their entry into the French Zone of the Sherifian Empire, the products enumerated below are admitted to importation or transit without restrictions concerning the place of entry and are not subject to sanitary inspection, disinfection, fumigation, return or destruction :—

(1) Grain of the following cereals :—
Wheat (cultivated species of the genus *Triticum*) ;
Barley (cultivated species of the genus *Hordeum*) ;
Oats (cultivated species of the genus *Avena*) ;
Rye (*Secale cereale*) ;
Maize (*Zea Mays*) ;
Rice (*Oryza sativa*) ;

(2) Seed of :—
French beans (*Phaseolus vulgaris*) ;
Peas (*Pisum sativum*) ;
Lentils (*Ervum Lens*) ;
Broad beans (*Faba vulgaris*) ;
Vetches (*Vicia sativa*) ;

(3) Coffee beans (*Coffea arabica*, *C. liberica* and *C. stenophylla*) and green leaves of tea (*Thea chinensis*) ;

(4) Black pepper (*Piper nigrum*) ;
Cloves (*Eugenia aromatica*);
Cinnamon bark (*Cinnamomum zeylanicum*) ;
Ginger (*Zingiber officinale*) ;
Galangal (*Alpinia officinarum*) and, in general, all spices other than pimento ;

(5) Dried lavender (*Lavandula vera, L. latifolia, L. Stoechas*) ;
Dried garden thyme (*Thymus vulgaris*), dried sarsaparilla (*Smilax sarsaparilla*), senna (*Cassia* sp.), seeds of anise (*Pimpinella Anisum*) and stellated anise (*Illicium anisatum*) ;

(6) Gums, resins, gum-resins, incense, benzoin, resin of aloes, various nutgalls (Chinese galls, Takaout, oak galls, etc.) ;

(7) Dried medicinal plants in packets ;

(8) Blocks of wood, cork, bark, tan, poles, rods, railway sleepers, rough timber and firewood ;

(9) Industrially dried vegetables, flours, food pastes, brans, oilcakes, straw and hay, with the exception of dried fruits (*Ibid.*, p. 428-429).

*** By Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation of 19 February 1931, the products or objects enumerated in Art. 5 of the ' dahir ' of 20 September 1927 concerning phytosanitary measures for the plants submitted on entry into the French Zone of the Sherifian Empire to sanitary inspection, fumigation, disinfection or to return, must, within two hours of the completion of these operations be removed from the fumigation chambers, vats, buildings or other premises of the regional service of inspection for the protection of crops.

Consignees, or their representatives, of products or objects which have not been removed in accordance with these regulations are liable to the payment of a tax calculated according to the weight indicated on the customs declaration form and in the following manner :—

(1) Two francs per hour per quintal of the raw product ;

(2) Parts of an hour are calculated as whole hours.

(3) Only the hours of storage included between the legal opening and closing hours of customs offices are taxable. (*Ibid.*, p. 429).

*** By Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation of 27 March 1931 the plant products specified below must on their entry be accompanied by a certificate of sanitary inspection :—

Plants in soil or in pots ;

Potato tubers, tomatoes, aubergines.

Certificates of sanitary inspection accompanying consignments of potatoes, tomatoes and aubergines must be in accordance with the regulations of the Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation of 25 May 1928, as modified by the Decrees of 9 November 1928 and 15 June 1929. (*Ibid.*, p. 429).

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Mexico. — A Regulation of 12 December 1930 authorises the construction o aeroplanes for the control of diseases and pests of crops, and fixes the characteristics of the machines and the regulations for their use.

The Ministry of Communications and Public Works, in agreement with the Ministry of Agriculture and of the ' Fomento ', is authorised to collect a tax per hectare, as duty for service, which will be fixed in each case, taking into account the particular disease or pest, the area and distance of the land to be treated.

The Ministry of Communications and Public Works, on the recommendation of the Ministries of Agriculture and the ' Fomento ' and of Finance and Public Credit, will grant concessions to private persons or firms of Mexico desiring to provide for the construction or importation of the prescribed type of aeroplane. (*Diario Oficial*, México, 20 de diciembre de 1930, tomo LXIII, núm. 42, pág. 8).

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INTERNATIONAL BULLETIN
OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

Algeria: Latest Locust Invasion (1).

In the spring of 1930 Algeria underwent an invasion of desert locust (*Schistocerca gregaria*) which had been foreseen by the Technical Services from the end of December 1929 as a result of accurate information supplied by the Anti-Locust Posts of the Southern Territories. Control measures have thus been decided on without hurry and the stocks of equipment and specially ingredients collected within the requisite time. Highly satisfactory results have been recorded everywhere.

Department of Oran. District of Tlemcen. — The first swarm was reported in the district on 29 December 1929, to the S. W. of El-Aricha in the Ouled-Nahar. The acute cold of the night and collecting carried out during the day completely suppressed it. On 11 January 1930 another coming from Morocco halted at Port-Say, then crossed the territory of the Achaches, the N. W. part of the Beni-Ouassine and the M'sirda. On 24 January locusts coming from the mixed commune of Marnia began the invasion of the mixed commune of Nedroma to the Souhalia and the Beni-Menir, then little by little gained the west and north of the district. Their pink tint was already turning to a sienna colour. On 11 March some large swarms settled in the commune of Nemours in the valleys of the Oueds Ghazouana and Tléta. On the 29th of the same month the mixed commune of Remchi was in its turn infested, the pests being reported in the tribe of the Beni-Ouarsous, neighbouring Nedroma, at the foot of the Djebel-Sefiane and at Ras-el-Madher. From then on the invasion became rapidly worse. Eggs were marked down daily nearly everywhere. The locusts continuing their progress in the direction of the Tafna reached Montagnac and its outskirts and even the sea towards Rachgoun and Beni-Saf. On 24 April certain groups ascended the valley of the Isser to Sidi-Abdellys

All the flying swarms up to the present recorded came from eastern Morocco. But from now on the situation became rapidly more serious because of a huge invasion looming up from the Southern Territories. In May this took considerable dimensions ; swarms descended the valley of the Tafna, depositing eggs along their route, to Marnia, then turning to the N. W. extended over the territories of the M'sirda, the Souhalia, the Beni-Menir and the whole commune of Nemours. At the same time another dense swarm followed the valleys of the Oueds Chouly and Issers and stopped between the Abdellys and Aoubellil. Finally, on 8 June a last swarm

* In this, as in the next two chapters, the countries are arranged in French alphabetical order.

(1) Report of Mr. M. Delassus, Inspecteur de la Défense des Cultures, official correspondent of the Institute, transmitted by the General Government of Algeria (Direction de l'Agriculture et de la Colonisation).

arrived by way of the Tafna, bore to the east on its exit from the gorges of Medjahed and alighted on upwards of 1,500 hectares of the land of the Turenne colony.

District of Sidi-bel-Abbès. — After having been reported for the first time towards Oglat-Taerziza (mixed commune of Télagh) locusts appeared nearly simultaneously (24-25 April) at Rochambeau, Zegla and in the forest of Zid-el-Mounen (mixed commune of Télagh), then at Tirman (24 April) Télagh P. E. (28 April) Tassin, Parmentier, Sidi-Daho (1-5 May), Lamtar (5-6 May), Chanzy and Berthelot (7 May), Tabia (16 May), Palissy (17 May), Détrie (19 May), Bel-Abbès (20 May), Mercier-Lacombe (22 May), Boutin, Tenira, Mosser (20-22 May), Deligny and Prudon (1-6 June). On 6 June the locusts flew over the village of Trembles and disappeared in the direction of Oued-Imbert. Their progress was in 4 main directions :— by the Oued-Sefioun towards Berthelot, by the Oued-Melrir towards Tenira and Mercier Lacombe, by the Oued-Mekerra towards Rochambeau, Tabia, Chanzy and Bel-Abbès. The fourth swarm coming from the W. S. W. seems to have been driven into one channel towards the N. E. after having come up against the mountains to the west of the Tessalah chain. According to the old planters of the region all previous invasions have followed one or other of these routes and more particularly the valley of the Oued-Mekerra.

District of Oran. — This was infested by locusts coming both from the districts of Tlemcen and Sidi-Bel-Abbès. The former swarms invaded the Aoubellil douar (Aïn-Témouchent) on 3 May, the communes of the Trois Marabouts on the 8th, Turgot on the 13, Rio-Salado on the 21st and Er-Rahel on the 22nd ; the others invaded the commune of Oued-Imbert on 11 June, certain small swarms towards the end of the month reaching even Saint-Denis-du Sig, Bou-Henni, Mocta-Douz and Saint-Lucien.

District of Mascara. — The course of the invasion into this district followed two main routes :— the first by the valley of the Oued-Melrir ; the locusts penetrated from 22 May into the mixed commune of Mascara and remained till the end of June successively in the regions of Melrir, Aïn Fras, the Oued-Hammam valley, Ouled-bou-Saïd, Bou-Hanifia ; on 15 June small swarms passed into the commune of Doublineau. The second route was by the valley of the Oued Sefioun and its tributaries ; the locusts which on 7 May had been seen at Berthelot (District of Bel-Abbès) reached the Hounet and Aïn-Manâa douars and deposited eggs there up till 15 May.

District of Mostaganem. — The first flying swarms made their appearance there in January in the mixed commune of Aflou. They then disappeared in the direction of Djelfa-Chellala and until 15 May the district was free of them. On this day locust bands settled in the Sersou penetrated into the department of Oran. These swarms coming from Vialar covered for a fortnight the north of the mixed commune of Tiaret (douars Ouled-Lakhred, Tida, Bechtout and Guertoufa) and the south of that of Ammi-Moussa (douars Ouled-Bakhta, Maacem, Ouled-Berkame and Mekmène). The smaller ones following the valley of the Oued-Riou reached first Guillaumet on 25 May, then Ammi-Moussa and El-Alef on the 30th, Inkerman on 3 June and alighted finally in the mixed Commune of Renault.

A second swarm followed the valley of the Oued-Nasfa and infested the douar Ben-Louna of the mixed commune of Zemmora, deposited eggs at Kenenda and Zemmora and continuing its course arrived on 6 and 7 June at Relizane. Driven

by a strong southerly wind it reached the mixed communes of La Mina and Cassaigne and finally the valley of the gardens (Mostaganem).

Department of Algiers. District of Orléansville. — Towards 6 May the first flying swarms made their appearance in the mountains of Ouarsenis, invading first the douar of Beni-Chaïb (Djebel Arak, Djebel Araïr, Djebel Aïn-ben Youcef, the valley of the Oued Mekeberta, Djebel Groune), then the douar Lardjem. From 6 to 16 May they followed in a N. E.-S. W. direction the valley of the Oued Fodda ; on the 17th, 18th and 20th some sparse swarms were reported at Oued-Fodda, Carnot, Vauban ; but the main column turning west near Lamartine invaded the douars of Beni-bou-Khannous, Marchoun, Tsighaout, then Orléansville (19, 21 and 13 May) by the Medjadjas ; the advance guard reached the douars of the Heumis and Baghdoura (mixed commune of Tenès) and finally the sea, after having flown over the douars of Taourira and Beni-Haoua (5 June) ; this last mass followed the Oued Dahmous valley. Certain swarms of little importance separated off, however, at the start and after having passed over the douars of Beni-Ouazan, Guerboussa, Sidi-el-Laroussi, Masséna, rejoined the first column by way of the Warnier gap without reaching the centre of Malakoff.

District of Miliana. — On 26 April the advance columns of very large swarms, following a general S. E.-N. W. direction and coming from the mixed commune of Chellala, alighted to the south of the mixed communes of Téniet-el-Haad and the Gersou. From then until mid May the locust invasion continued without interruption, always towards the N. W. over the whole of the Sersou. The territory of Bourbaki in the centre alone was spared. It marked also the point of bifurcation of the main wave, one branch extending widely over the centres of Victor Hugo (26-29 April), Hardy (26 April, 3 and 4 May), Burdeau (5 and 6 May) and Vialar (6 and 7 May). Bad weather, copulation and egg laying delayed the locusts there for ten days during which they made local movements spreading the contamination. Leaving this region they then reached the mixed commune of Chéliff by way of the Oued Lardjem valley. The other branch following a route further east commenced at Taine, reached the 2 Marabouts, then Taza-Trolard, by the easiest gradient. Thus the greater part of the locusts turning at Téniet-el-Haad took to the valley of the Oued Tighzert near Taza and followed it until the confluence of the Oued Kremais which they then ascended. Describing a half loop they regained on 9 May before Marbot a S. E.-N. W. direction. Helped by the wind these swarms touched the mixed commune of the Braz and spread into the district of Miliana. At mid-day on 11 May Port-du-Caïd received their visitation, the region of Affreville was from that time directly threatened but the east wind starting to blow again diverted the movement of the column in the direction of the Oued-Zedine.

Besides these two main invasions another soon appeared towards the mixed commune of Djendel. The locusts arrived by the Chéliff above the Gribbs dam. They came from the Boghari region. Held back by unfavourable weather they did not depart until 15 May, after which they made a sudden appearance at Borély-la-Sapie and Amourah on the banks of the Chéliff.

At the same time some small swarms reached Lavarande, then Duperré, and setting off rapidly without causing damage arrived on 11 and 17 May at Levacher where they alighted for copulation and egg laying.

On 20 May the survivors set off again towards the north. Those from the Djendel followed up or crossed the Ganntas and were reported at Changarnier and Adélia on the 24th and 25th at Hammam-Rhira. Those from Levacher flew over the Bou-Maad into the valley of the Oued-Damous and reached the shore.

District of Médéa. — The first swarm coming from the S. E. penetrated on 3 April into the mixed commune of Chellala (douar Megane), alighted and began laying ; one part almost immediately took flight again towards Rechaïga from where after a few days' stay it reached the Sersou (25 April). The remainder of the swarm, soon enlarged by others of varying size, followed the gullies of Guelt-es-Stel, reached Aïn-Oussera on the 5th and settled in the Chabounia and Boughzoul douars of Boghari mixed, Birine, Zenzach and Bennehar of Aïn-Boucif. Bad weather then dispersed the swarms into small groups which were observed in succession in the douars of Oum-el-Djellil, M'fatah, Saneg and Ouled-Anteur. The most serious part of the swarm bore to the N. W. in the shelter of the highest mountains in the commune of Téniet-el-Haad. Starting on 5 May certain swarms driven by a violent wind blowing over the whole region followed the upper valley of the Oued Chéliff and appeared some days later in the commune of Djendel, while others turning directly north arrived at Arthur, Tlétat-des-Douairs and Brazza (Berrouaghia mixed).

District of Algiers. — On 1 December 1929 the first swarm of red locusts coming from the badly contaminated territories of the Ouled-Djellal alighted in the mixed commune of Bou-Saada, near Aïn-Rich (douars of Ouled-Mohamed-el-M'barek), and remained until the 11th when part of the swarm flew away to the S. E. and part to the S. W. A second invasion from the same quarter occurred on 19 March (douar Roumana). On the 24th and 25th three swarms from the west settled, one in the Oules-Sidi-Brahim, one in the douar Mohamed-el-M'barek and the other in the douar of Sidi-Hadjères (Sidi-Aïssa), then shortly afterwards resumed their flight like the others towards the south. On the 31st locusts were reported over 500 hectares of the douars of Ouled-Sidi-Brahim ; they departed again the next day in a northerly direction and alighted in the douar of Sidi-Hadjères, staying there until 4 April when as a result of bad weather they took flight towards the S. E. and were probably the swarm which the same day flew over Bou-Saâda. This commune was seriously contaminated from then on, for dense swarms invaded also the douars of Ouled-Gherib and Amara. From the 10th deposits of eggs were marked in many places. From 5 to 12 April the general migration towards the north was clearly apparent. On the 7th locusts settled on 600 hectares round the Kouba of Sidi-Hadjères ; on the 11th more or less dense swarms alighted over the whole territory stretching from the south of the Ouled-Ameur douar (Bou-Saâda) to the north of Sidi-Aïssa and were increased from the next day by considerable bands advancing on a front of 70 kilometres. The region to the south of the Adaouaras was soon the most seriously invaded.

On 23 April the mixed commune of Aumale was in its turn invaded ; swarms settled in the douars of Ouled-Djenane and Serdoun ; others were also reported on the 26th and 27th in the douars of El-Mora and Intacen and it was probably portions of these same swarms which on these dates reached on one hand the douar of El-Euch of Tablat mixed, departing again without laying, and on the other El-Esnam (mixed commune of Maillot). Arrivals from the south continued ; on 3 and 11 May locusts alighted again in this commune on the banks of the Oueds Hamsone, Anasser and Berdi and on the 4th even reached the commune of Akbou (Aït-R'zine) covering 10 hectares on the banks of the Oued-Bou-Sellam.

Part of the Algiers district was contaminated also by locusts from Djendel. Those which crossed the Gantas reached Meurad by way of Changarnier and Hammam-Rhira and deposited eggs near the dam ; after a short halt they took flight again and alighted on 27 May on the Oueds Damous Arbil, Messelmoun and Touarès near

the centre of Marceau. Some secondary swarms followed them and passing by Zurich one part went by the Oued Bakora towards the Ghenoua and the commune of Cherchell P. E. where it settled in some vineyards, and another part went towards Tipaza where it was reported on 6 June.

Department of Constantine. District of Sétif. — Locusts were first reported here in the commune of M'sila. Coming from Barika they alighted on 15 March in the douar of M'cif, on 17 March on the outskirts of the centre, on 3, 4, 6 and 12 April in the douars of Saïda, Chellal, M'cif and Bou-Hamadou. Everywhere the swarms remained and their numbers were swelled by new arrivals from the south (Bou-Saâda) which increased their breeding grounds. On the 26th a large swarm left the commune and was reported some hours later in that of Maâdid at Cérez. Another swarm reached Galbois and the douar of M'barek on the 27th. The migration to the north continued during the following days. On the 27th eggs were already reported over 10 hectares in the douar of Zemmoura (Bibans). On the 30th a large new group coming from the south deposited eggs on 350 hectares in the Ouled-Taïer douar of his same commune ; on 5 and 7 May smaller flights were still observed in the douar of Sidi-Amor.

In all the other communes of this district the invasion passed nearly unnoticed. Isolated locusts were reported almost everywhere during May but did no damage. One swarm only need be mentioned : coming from Barika it alighted on 26 April in the douar of Sou-Thaleb (Rhira) ; it was mostly destroyed and the survivors departed towards the north without even depositing eggs.

District of Batna. — In this district the invasion of desert locusts was of little importance. The mixed commune of Barika alone received a number of swarms from 26 January to 29 April, the chief egg deposits being in the vicinity of the oasis of M'doukal. In that of Belezma small swarms coming from the direction of the douar Oued-Aouf of Aïn-Touta alighted on 4, 14 and 28 April in the douar of Merouana and laid eggs over fifty hectares. The commune of Aïn-el-Ksar was not, properly speaking, invaded, and it was barely that on 2 May some locusts driven by a strong south-westerly wind reached Mezerr near the boundary of the commune of Batna.

Area of Egg Deposits. — According to figures supplied by the Administrators of the mixed communes and the mayors the area covered by eggs of desert locusts in Algeria in 1930 reached 120,663 hectares.

Incubation Period. — We have hitherto had as a guide only the somewhat inadequate data contained in Künckel d'Herculais' " Les sauterelles en Algérie " and the still less accurate reports of planters who have been present during previous invasions in various parts of Algeria. Last season has enabled us to collect valuable information on the subject. The incubation period depends on the time of laying, the exposure and the nature of the ground. Hatching occurs first on the slopes with a southern exposure and there first in the sandy light soils ; it is less rapid in silico-calcareous soils, less still in heavy soils. The minimum period seems to be 15 days, the maximum 45 days.

Damage. — Damage caused by desert locusts has been the subject of the most exaggerated reports. It thus seems of interest to give useful details on the matter. In general it may be said that control measures were carried out so rapidly and effectively that except in rare cases the damage everywhere was nil or insignificant. Such damage as occurred was mostly negligible and was almost always caused by

adults, against which the known means of control (night collecting, poisoned bait) give only relatively satisfactory results. It was the market gardens, which moreover are seldom important in the invaded regions, which were particularly attacked.

Eritrea: Locusts *(Schistocerca gregaria)* (1).

During February 1931 no hatching of hoppers was reported.

With the exception of a small swarm observed on the 2nd at Mai Abar, coming from the highlands and flying towards Nefasit, locusts were reported only over the coastal zone of the eastern plain.

On the 10th a swarm of nearly mature locusts coming from Ghedem flew over Zula in the direction of Arafalì.

On the afternoon of the 18th red locusts of unknown provenance alighted in the territory of Mersa Fatma ; on the 19th at dawn they took flight again in a south-westerly direction.

On the 20th a swarm was reported coming from Arafalì and flying towards Massaua.

On the 23rd and 24th other swarms coming from Buri flew towards the territory oî Agambussa.

In addition to the destruction of located breeding places by special gangs a constant watch is being maintained in all the localities of the eastern plain in which there is risk of further hoppers.

Turkey: Crop Pests during 1930 (2).

Cereals.

Microtus arvalis, Apodemus flavicollis and *Spermophilus* sp. These three mammals have caused much damage to cereal crops in Asia Minor. Satisfactory control was obtained by the use of the ' Hora ' apparatus. Another effective and economic method of control consists in the use of grain poisoned with various chemicals. The Bacteriological Laboratories of Angora, Stamboul, Erzinjan and Mardin, which are under the Ministry of the Economy, are also studying control by virus.

Syringopais (*Scythris*) *temperatella.* The damage caused by this insect is reported to have diminished. It is a pest particularly of regions of ill-cared-for crops.

Zabrus gibbus was very abundant in a large part of the country.

Eurygaster. This genus is widely distributed in the country. Specimens collected in different regions have been identified by Dr. Horwath of Budapest. The species recognised are :— *E. austriaca* (Dardanelles) and its varieties *obliqua* (Adalia) and *frischii* (Adalia, Mersina), *E. integriceps* (Dardanelles, Stamboul) and its varieties *plagiata* (Angora, Smyrna) and *hellenica* (Adalia, Mersina).

Aelia. The species of *Aelia* occurring in the country are :— *Ae. acuminata* (Adalia, Mersina), *Ae. rostrata* (Adana) and *Ae. virgata* (Angora).

(1) Communication from the official correspondent of the Institute, Dr. A. De Benedictis, Capo dell'Ufficio Agrario della Colonia Eritrea, Asmara.

(2) Communication from the official correspondent of the Institute, Mr. M. Sureya, Councillor of State, Angora, Turkey.

Tobacco.

Phthorimaea heliopa. This insect which originates in India has appeared in the Mediterranean region. In 1930 it did much damage, specially in the vicinity of Smyrna.

Anise.

Depressaria pimpinella. The anise crops were seriously attacked by this insect in the neighbourhood of Tekir-Dagh (Thrace).

Fruit trees.

The following parasites have been observed in the orchards of Angora on apricot and almond trees : — *Cimbex quadrimaculata* var. *humeralis* and *Diloba coeruleocephala.*

Beet.

This crop was infested with *Cleonus* (*Bothynoderes*) *farinosus* (Thrace) and *Cassida seraphina* (Eski-sher).

VARIOUS QUESTIONS

The Disinfection of Plants with Soil from the Standpoint of the Insect Fauna (1).

The danger of transporting insect pests in shipments of plants with soil about the roots, forwarded from one continent to another, is one that has been recognized for some time. Certain countries have already taken the extreme precaution of prohibiting the entry of plants with soil and others may be contemplating doing so. Such being the case, it would appear that countries largely concerned in exporting such commodities, would be well advised to contemplate instituting researches and investigations on this problem.

In a memorandum issued by the Federal Horticultural Board (1), it is stated that the State Entomologist of New Jersey had made a limited study of the insect fauna of balled plants imported from Europe, which resulted in the finding of over twenty different species of insects in the soil. In the same publication it is also stated that " There is risk of entry from foreign countries through the medium of such soil, of a vast number of insects, many of which have no relation to the plants imported but are possibly important enemies of field crops, such as clover, alfalfa, and other forage crops and grains. For example, there are more than a score of European weevils and root borers known to infest clover, alfalfa and related plants ... of the same nature are many insects which affect common truck (vegetable) crops, as the European mole cricket (*Gryllotalpa gryllotalpa*), European earwig (*Forficula auricularia*), and various wireworms (*Elateridae*)... There are also many important Euro-

(1) Communication from the official correspondent of the Institute, Mr. Arthur Gibson, Dominion Entomologist, Entomological Branch, Department of Agriculture, prepared with the assistance of Mr. I. S. McLaine, Chief of the Division of Foreign Pests Suppression and Secretary of the Destructive Insect and Pest Act Advisory Board, Ottawa, Canada.

pean fruit insects which can be introduced with soil about the roots of nursery stock. These include apple, pear and plum weevils, fruit and bud weevils, twig and stem borers and various leaf-feeding insects which hibernate in the soil ".

In a circular (2) issued by the above organisation, it is stated that " one hundred and sixty-eight kinds of insects have been intercepted in soil accompanying foreign plants arriving in the United States from August 20, 1912 up to and including April 22, 1922. Of this number there are a dozen or more species of insects new to this country and which are recognized as injurious pests in foreign countries ". Among the pests mentioned in this circular as having been intercepted are a wireworm (*Agriotes lineatus*), " which is considered a very injurious pest to cereal crops in Europe ", and which was collected in soil from Finland ; the so-called black pine weevil (*Brachyrhinus sulcatus*) was collected on several occasions from various countries ; no less than six genera of weevils have been intercepted ; and the European earwig and European mole cricket were undoubtedly introduced in soil accompanying plants.

The investigations of Morris (3) caried on at the Rothamsted Experiment Station on the insect and other invertebrate fauna of arable land, furnished some very interesting and important data. Samples of soil were taken from different plots and all insects and other invertebrates were recorded together with the approximate depth at which they occurred. Plot I, which had received 14 tons of barnyard manure per annum since 1843, had 15,100,000 invertebrates per acre, of which 7,720,000 were insects ; Plot 2, which had received no manure since 1839, had 4,950,000 invertebrates per acre, of which 2,470,000 were insects. The greatest number both of insects and other invertebrates occurred in the upper three inches of soil, but some species were found in larger numbers at a greater depth. The greatest number of *Elateridae* larvae were found at a depth of five to seven inches and *Symphyla* at a depth of seven to nine inches, *Elateridae* larvae were found to the number of 198,653 to the acre in plot one, and 164,983 in plot two. Nine different orders of insects were represented in these collections. The fact that so many insects are present in the soil indicates the danger of shipping plants with soil, not only from the field, but also the use of such soil for potting greenhouse plants is one of considerable danger. The great increase in the number of insects present in the heavily manured land should also be noted. Undoubtedly such conditions exist in nurseries or in soil used for potting which is heavily fertilized.

A good deal of work has been done in investigating soil insecticides. Particular mention was made of the investigations of Leach in connection with the control of the Japanese beetle, *Popillia japonica*. According to Smith and Hadley (4), more than 40 chemicals have been used in treating infested soil balls, among them being ether, petroleum ether, toluene, acetic ether, nitrobenzene, chloroform and others. Carbon-bisulphide emulsion is now used extensively for the treatment of plants with soil about the roots, for Japanese beetle, including arborvitae, spruces, hemlocks, rhododendrons, azaleas, blueberries, hydrangeas, ferns and similar plants, besides numerous varieties of potted stock. The carbon bisulphide emulsion is also used for killing larvae in lawns or golf greens. Arsenate of lead (5) is used for mixing with the soil of flower beds or new lawns, at the rate of 1,500 lbs. to the acre, and soil so treated has remained grub proof over a period of five years.

Various toxic gases such as carbon bisulphide, carbon tetrachloride, sodium cyanide, naphthalene, paradichlorobenzene, etc. have been experimented with as a possible means of controlling the peach tree borer (6).

Calcium cyanide either in the dust or granular form has proved successful in controlling the cranberry root worm in cultivated blueberries (7). Essig (8) in Cal-

ifornia, first tried paradichlorobenzene as a fumigant for the Pacific peach tree borer (*Aegeria opalescens*) and then extended his investigations to the woolly apple aphis (*Eriosoma lanigerum*), the pear root aphis (*Eriosoma lanuginosum*), the grape phylloxera (*Phylloxera vitifoliae*), wireworms, and the garden centipede (*Scutigerella immaculata*).

C. A. Thomas (9) of Pennsylvania in a bulletin recently issued reviews the research on wireworm control and lists a series of seed treatments investigated by many experimenters, including arsenic compounds, fluorine and copper compounds, mercury compounds, sulphur compounds, miscellaneous organic compounds, organic chemicals, etc.; and as contact insecticides against the larvae, mentions paraffin, tar oils, soap solutions, various emulsions, pyrethrum, tobacco dust, mustard and borax. Among the fumigants against the larvae are mentioned cyanides, carbon bisulphide and its emulsions, naphthaline, chloropicrin, paradichlorobenzene, petrol, benzene, toluene, cresylic acid, tetrachlorethane, pyridine, formaldehyde, ammonia, apterite and sodium sulphocarbonate.

In presenting a review of the present position with regard to soil insecticides, H. W. Miles (10), states that " The problem of controlling insects and allied animals which live in the soil and feed upon the underground portions of plants is one of the most difficult of the many problems which confront economic entomologists at the present time... Although no soil insecticide for general application has been discovered, a number of chemicals are being used for the control of soil pests ". He then reviews the damage caused by soil infesting insects on field crops, cereals, crops under glass, market gardens, etc. The results obtained by the use of various chemical substances is given, such as naphthaline, other coal tar products, hydrocyanic acid gas, corrosive sublimate, carbon bisulphide, formaldehyde and miscellaneous soil insecticides.

In preparing this memorandum no attempt has been made to cover the field in a comprehensive manner, but rather to point out the danger that does exist in the transporting of plants with soil from one country to another, and second, that the question of finding a suitable soil insecticide is a problem that has received the attention of workers in many countries. There is still much work to be done for the discovery of a general soil insecticide has not yet been made. It is not, however, merely the question of the insect fauna in soil that is cause for alarm but also the question of plant diseases.

As mentioned in the opening paragraph, there appears to be no question as to the advisability of instituting further researches in connection with this most important problem.

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(2) Federal Horticultural Board, Washington, D. C. Circular (H. B. 150), issued May 12, 1922.

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LEGISLATIVE AND ADMINISTRATIVE MEASURES

French Colonies. — By Ministerial Decree of 2 February 1931, Art. 1 and paragraph 2 of Art. 7 of the Ministerial Decree of 3 December 1929 (see this *Bulletin*, 1930, No. 6, pp. 90-91) concerning the protection of cacao plantations in the French Colonies, have been modified as follows :—

'Article 1. — In the French Colonies specified in Art. 7 of this Ministerial Decree the importation, circulation, storage and transit are prohibited of plants, plant parts, pods and fresh beans of cacao, also of soil and packing materials accompanying them, coming either from countries where the presence of the disease known as witches' broom ('balai de sorcière') and attributed to *Marasmius perniciosus* has been proved or from any country where the importation of such plants or plant parts is not prohibited or submitted to phytopathological control'.

'Art. 7. — . . . . . .

'The prohibitory regulations contained in Art. 1 of the present Ministerial Decree are applicable to the products specified coming from South America, Central America, Mexico and the West Indian Islands'. (Ministère des Colonies. Institut National d'Agronomie Coloniale. *L'Agronomie Coloniale*, Paris, 1931, 20e année, nº 158, p. 55).

Indochina. — By Decree of the Governor General, dated 10 January 1931, the Institute of Agricultural Research of Indochina includes among others the following establishments :—

North Indochina Section. — Phytopathological Division : Entomological Laboratory, Mycological Laboratory.

South Indochina Section. — Phytopathological Division : Entomological Laboratory, Mycological Laboratory. (Ministère des Colonies. Institut National d'Agronomie Coloniale. *L'Agronomie Coloniale*, Paris, 1931, 20e année, nº 158, p. 54).

Italy. — A Ministerial Decree of 20 February 1931 enacts that the exportation of carnations from the provinces of Liguria to Germany may be allowed only if the flower stems have been freed from axillary leaves and flower buds and if the calices and flower stalks are not infested with *Tortrix pronubana*.

The Royal Regional Phytopathological Observatory for Liguria will undertake inspection and will certifiy the observance of this regulation. Any infringement will be punishable under Art. 26 of the Law No. 94 of 3 January 1929 (cf. this *Bulletin*, Year III, 1929, p. 28) (1).

* * * In accordance with the request presented by the Royal General Commissioner for the Control of Citrus Scales in Sicily and Reggio Calabria, by Ministerial Decree of 18 March 1931 cyanide of calcium, $Ca(NC)_2$, has been officially recognised for use, alone or mixed with other substances, as a poisonous gas within the meaning of Art. 57 of the text of the laws of public safety approved by Royal Decree No. 1848 of 6 November 1926, and its use is subject to the provisions of the special regulation for the utilisation of poisonous gases approved by Royal Decree No. 147 of 9 January 1927 (cf. this *Bulletin*, 1927, No. 3, p. 41) in the same manner as the alkaline cyanides of potassium and sodium. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 4 aprile 1931, anno 72°, n. 78, p. 1545).

Latvia (2). — List of the serious diseases, pests and plants the importation of which is forbidden (published in the 'Valdibas Vestnesis', No. 63 of 19 March 1931):

Diseases and pests of the apple:— *Eriophyes malinus, Blastodacna putripenella, Rhagoletis pomonella, Anisandrus dispar, Eriosoma lanigerum, Aspidiotus perniciosus, A. ostreaeformis, Lepidosaphes ulmi, Bacillus amylovorus, Bacterium tumefaciens, Pseudomonas papulans, Podosphaera leucotricha, Glomerella cingulata, Nectria galligena, Physalospora Cydoniae, Nummularia discreta*;

Diseases and pests of the pear:— *Eriophyes piri, Anisandrus dispar, Aspidiotus ostreaeformis, Lepidosapes ulmi, Bacillus amylovorus, Bacterium tumefaciens, Venturia pirina, Nectria galligena, Physalospora Cydoniae*;

Diseases and pests of the plum:— *Eriophyes similis, Anisandrus dispar, Aspidiotus ostreaeformis, Lepidosaphes ulmi, Bacillus amylovorus, Plowrightia morbosa*;

Diseases and pests of the cherry:— *Rhagoletis cerasi, Anisandrus dispar, Aspidiotus ostreaeformis, Lepidosaphes ulmi, Bacillus amylovorus, Bacillus spongiosus, Plowrightia morbosa*;

Disease and pest of the gooseberry:— *Bryobia praetiosa, Sphaerotheca mors-uvae*;

Pest of the black currant:— *Eriophyes ribis*;

Diseases and pests of the grape vine:— *Eriophyes vitis, Phylloxera vastatrix, Plasmopara viticola, Uncinula necator*;

Pests of the strawberry:— *Aphelenchus fragariae, Tarsonemus fragariae*;

Disease of the raspberry:— *Didymella applanata*;

Pest of the hazel:— *Eriophyes avellanae*;

Diseases of lilac:— *Pseudomonas Syringae, Phytophthora Syringae*;

Pest of firs:— *Dreyfusia nüsslini*;

Disease of *Berberis Aquifolium*:— *Uropyxis sanguinea*;

Diseases and pests of flower bulbs:— *Rhizoglyphus echi-*

(1) Communication from the Ministry of Agriculture and Forests.

(2) Communication from the official correspondent of the Institute, Prof. Max Eglits, Phytopathological Laboratory of the University, Riga.

nopus, Merodon equestris, Pseudomonas Hyacinthi, Sclerotinia bulborum, Sclerotium Tuliparum ;

Diseases and pests of plants under glass:— *Aphelenchus olesistus, A. ritzema-bosi, Gracilaria azaleella, Stephanitis rhododendri, Aleurodes vaporariorum, Coccidae* (all the species of this family), *Aplanobacter michiganense, Bacterium Pelargoni, Peronospora sparsa, Exobasidium discoideum, E. Rhododendri, Graphiola Phoenicis, Urocystis Cepulae, Puccinia Chrysanthemi, Coniothyrium Wernsdorffiae, Didymella Lycopersici, Septoria Azaleae, Gloeosporium Palmarum, Oidium Chrysanthemi, Oidium Hortensiae* ;

Disease and pest of the potato: - *Leptinotarsa decemlineata, Synchytrium endobioticum* ;

Plants the importation of which is forbidden:— *Berberis* (all species), *Rhamnus cathartica, Rh. Frangula, Pinus Strobus.*

Czechoslovakia. — In consequence of the outbreak of potato wart disease [*Synchytrium endobioticum*] within the jurisdiction of Vsetin, the Ministry of Agriculture has established by Ordinance of 11 March 1931 that in the districts of Wallachisch-Meseritsch, Rožnau on Rodhošt and Vsetin only varieties of potatoes resistant to wart disease shall in future be grown. The use of non-resistant potatoes is strictly prohibited ; this regulation will remain in force for ten years as from the date of the promulgation of the said Ordinance. (*Landwirtschaftliche Fachpresse für die Tschechoslowakei*, Tetschen, 20. März 1931, 9. Jahrg., Nr. 12, S. 101).

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IIème Partie. — Principaux insectes nuisibles des vergers. Chap. V : Les insectes des fruits. — Chap. VI : Les insectes piqueurs des fruits. — Chap. VII : Les insectes du feuillage. — Chap. VIII : Les insectes des jeunes pousses. — Chap. IX : Les insectes des boutons à fleur. — Chap. X : Les pucerons et autres insectes piqueurs. — Chap. XI : Les insectes xylophages. — Chap. XII : Les insectes de la vigne. — Chap. XIII : Considérations générales sur la pratique des traitements insecticides et anticryptogamiques].

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DISCOVERIES AND CURRENT EVENTS *

Algeria: Information on the Last Anti-Locust Campaign (1).

The Crop Protection Service, in 1930 made provision, in drawing up the instructions for preventive measures to be taken against desert locust (*Schistocerca gregaria*), for the collection of these adults. The campaign has been largely carried out in the Department of Oran, but not, on the contrary, in some occasional communes of the Department of Algiers (Boghari) and Constantine. A procedure in turn extolled and disapproved of, we consider that it may still have some utility, if its application is considered in a rational and general manner. If it is to be justified, it must be taken up by all the syndicates of protection, pursued actively during the whole of the beginning of the season, and particularly, in the South and the High-Plateaux. It should end definitely towards June, as by then most of the eggs have been laid and the crickets are to be found in the sub-coastal or coastal regions at the end of their migration and also because parasitic action is then at its maximum. If it is carried out under such conditions at the moment when it would be relinquished for biological reasons, the swarms would already have been greatly reduced and the protection of valuable crops would be easier to accomplish. It should be done by hand, by rake, or by melhafa by squads of workers, paid, if possible, at piece work rates. The latter method of operation gives a very large yield in the evening from 6 p. m. onwards as the locusts, which no longer fly away, still possess a certain mobility ; the same conditions exist in the morning but then during only a very short time. Collection is not opportune unless the lands infested have a sufficient density and are not too distant from the meeting-place of the workers. It is not advisable if the ground is covered with dense thorny bushes and should be replaced by the method of crushing with metal brooms, an operation giving high yields but difficult to control, or by burning by means of the Dragon.

Last season produced a valuable witness of the efficacy of the work for the destruction of nests of eggs and has permitted us to make most interesting comments on this preventive method. The best results have been obtained from work carried out just after the eggs have been deposited. That carried out a few days before the normal period of hatching has no consequences other than to hasten the process, only those eggs being destroyed which are bruised by the mechanical action.

* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Report of Mr. M. Delassus, Inspecteur de la Défense des Cultures, official correspondent of the Institute, transmitted by the General Government of Algeria (Direction de l'Agriculture et de la Colonisation).

The maximum yield has been obtained on relatively loose and not compact soils with the European plough working at a depth of 12 or 15 centimetres followed by a second cross cultivation or superficial hoeing.

The latter is absolutely indispensable on compact lands where the plough turns up numerous clods in which the clusters of eggs continue their normal development.

The work is advisable on all land accessible to the teams. After the laying of the eggs in the crops, particularly in cereals, it is found useful to cultivate the edges of the fields and of the ground tracks where the females generally assemble for the laying.

Harrowing, by repeated superficial cultivation or deeper turning should be effected, as soon as possible, in the places where the plough cannot pass, particularly in the patches encountered in the middle of the cereals or other crops, as these are always the places where the crop is very poor or where the adults have caused damage.

Poisoned bait has been the best means of suppressing the breeding grounds of desert locusts before the crops can be damaged. The formula has been slightly modified in recent years and the proportions of arsenate of soda and molasses have been changed to 0.5 kg. and 1 kg. respectively for 10 or 12 kg. of bran. Experiments carried out during the season give reason to assert that it would be possible, without inconvenience, to use 0.4 kg. of the poisonous salt to be incorporated in the mixture.

In certain regions of Algeria, some farmers have believed it possible, on the basis of information gathered during a journey in Morocco, to prepare baits with the reduced quantity of 15 kg. of arsenate of soda per quintal of bran. The results obtained were insignificant and it could not have turned out otherwise. The proprietors in question did not take into account the fact that in Morocco arsenious acid is used and not sodium arsenate.

Another interesting fact has been brought to light : that poisoned bran may in a campaign against locusts, be used very early, even against hoppers of only 3 or 4 days old and this means that its use makes possible the almost complete suppression of the cresyl sprays and the melhafas. This is a considerable advantage as the application of these two methods of combat would practically, and for various reasons, be impossible in the event of a serious invasion. Cresyl is a product which is rather rare in local trade and the furnishing of supplies to syndicates presents difficulties which are often insurmountable. The melhafas require a large amount of manual and even perhaps experienced labour, the successful recuiting of which cannot always be ensured in most of the regions of the Colony liable to invasion by locusts. Although the use of arsenic treated bran has been immediately taken up in a number of communes previously contaminated by the Moroccan locust (*Dociostaurus maroccanus*) where its value was consequently well-known, we have, on the contrary, as formerly even in these same communes, met with much resistance in others which have not for many years experienced locust invasions.

It is sometimes not decided to have recourse to it until it has been considered whether it could not be possible to arrive at the result required by means of other methods of combat. The most intense opposition has been manifested in the Sersou. In actual fact, the efficacy of the mixtures was not always questioned, as in any case mention of this had been heard, but fears were entertained of the poisoning of livestock. A large number of such cases have, in fact, occurred. Since four years ago when the method was put into operation in the Colony, it is the first time that such losses have been recorded. The occurrence therefore causes astonishment, especially as Sersou is far from being the region of Algeria which consumes the largest quantities of toxic salts. It was interesting to attempt to seek its causes.

M. Marucci, a farmer at Vialar whose herds have been decimated, has already discovered one of them : the vengeance of natives, causing pre-occupation to Europeans proprietors, adding moreover, that in his opinion a large part of the misfortunes have the same origin. It may all the same cause surprise to learn that unused baits have been left in the fields at the end of the season instead of being immediately buried or destroyed in accordance with formal instructions given. All the cases of mortality however, cannot be ascribed to lack of watchfulness. At Hardy, for example, M. Boyer, agricultural adviser to the Miliana district, charged with the task of giving his opinion on what satisfaction should be accorded to demands for the indemnity of losses made by different farmers, was, in November, that is, four months after the cessation of the combative campaign, able to " extract cakes of bran two fingers thick and to obtain from two points on an area of 0.2 sq. metres 150 and 200 gms. of bran ". In this case, therefore a grave error had been made by the foreman the sole cause being bad distribution. If the instructions, which have been constantly repeated and which our agents were again ordered to renew at each inspection of the station, had been strictly followed, the bran would have been broadcast in the same way as seed and the animals, other than the hoppers, would not have been able to absorb a sufficient quantity to be seriously poisoned. The natives, who are generally opposed to the use of this method of prevention, to get rid of the quantities of bait entrusted to them, distribute it in more or less large heaps instead of sowing it. This greatly diminishes its efficacy and the risk of poisoning is on the contrary, considerably enhanced. It must, further, be added that the bait is only rarely watched and cases of imprudence frequently occur ; the sacks, full of prepared bait, are sometimes left at the roadside and often in the farmyards ; stacks of poison also are sometimes made on the roads and footpaths ; a bad preparation does not assure good enough mixture distribution of the arsenate with the bran and the former is often found to be in fairly large lumps. The reports of technical agents furnish precise information on this question and show that, in many cases, the cases of mortality recorded might have been avoided if the indispensable precautions had been taken. At all events, there must be no hesitation, and if Algeria, in 1931, again experiences an invasion of locusts, the use of poisonous mixtures must be made general as it is the only way of saving the situation. To renounce it would imply taking a great responsibility.

The ' Société des Produits A. L.', 1, rue Anatole France, Lille, experimented during last season, at first in the Taine region and then in that of Orléansville, with a new locust-killer. The conditions under which the experiments were carried out are described in the reports of Messrs. Dubuis and Lepigre, principal experts. Their conclusions were : " the product used has shown itself to be clearly superior to arsenate of soda and has permitted the quicker destruction of dense masses of desert locusts. The new formula excludes even molasses, a constituent which not only considerably increases the cost price but is also often difficult to transport ". If the results obtained were to be taken as a sole basis, there would be no hesitation, even for a single instant, in adopting this preparation, but the decision involves such grave consequences that it cannot be taken until after long reflection. Two items of information permitting a definite statement of opinion are still lacking ; the cost price of this insecticide and its composition. It is necessary, on the one hand, that the former should not be higher than that of bran arsenates and, on the other hand, that its poisonous properties for human beings and domestic animals should not be greater. If the inventor refuses to inform us of the elements contained in his cricket-killer, it is not at all certain whether the Administration, regardless of its admitted value, would be in a position to prescribe its use.

The ' Société Algérienne des produits chimiques et d'engrais ', rue de la Liberté, Algiers, has placed at our disposal, for experiment a certain quantity of the sodium fluor-silicate used first in the mixed commune of Sidi-Aïssa and then in that of Remchi by Messrs. Vaney and Rabot, principal experts. It is rather difficult to draw definite conclusions from these two demonstrations but recognition may all the same be given to the real efficacy of this product which has been used at the strength of 4 %, at the same time as a contact insecticide and as an internal poison. It is moreover, well known in Germany and America where it has given excellent results in combatting numerous kinds of insects. It appears at present to be difficult however, to substitute it for sodium arsenate. It seems indispensable that experiments with it should be pursued methodically during the next season ; if it yields, as may be expected, results of the kind obtained with the arsenic salt, then its adoption will have to be rapidly decided on. It is, in fact, a product having a price definitely below that of the latter salt (1.10 fr. instead of 2.80 frs.). Further, supplies to the syndicates would be greatly facilitated by the large stocks existing in Algeria.

In any case, if a momentary shortage of sodium arsenate were to arise during an anti-locust campaign, no fear need be entertained in making use of fluor-silicate.

A new scorching apparatus, the ' Dragon ' perfected by Messrs. Thibaudier and Fèvre of Algiers has been experimented with, with a certain amount of success during the last invasion. It consists of a cylindrical sheet-iron reservoir with autogenous welding, tested for a resistence of 5 kgs. per sq. cm. and having a capacity of 9 litres. In it is used a relatively economic fuel, gas oil (70 frs. per quintal), introduced through a hole in the upper part of the reservoir and capable of being hermetically closed by means of a metal plug. Inside, there is a Michelin air pump furnished at its end with a cork stopper ensuring the maintenance of pressure. The nozzle, about 1.75 m. long, is fixed to the apparatus by means of a simple rubber tube supported by clamps. It carries a copper tap, a filter plate of a system identical to that of some sulphur filters and another filter of tubular metal gauze fixed in the end. The latter contains the diffuser, the flame-screen and an asbestos wick. The first permits the violent ejection of a jet of liquid, which, on striking a flat surface, forms the slight mist necessary to ensure combustion of the gas-oil. The second protects the manipulator against the great heat evolved, concentrates the flame in the direction required and facilitates the decomposition of the gas-oil into the calories it contains. Lastly the asbestos wick serves to keep the flame alight in going from place to place or on surfaces devoid of all vegetation.

The colony has purchased 875 of these engines. They are decidedly superior to the Palanque apparatus hitherto in use. Their efficacy is greater, their flame hotter as the combustion of the gas is almost complete, their management is easier, their price (170 frs.) is modest, their working is economic as an apparatus can be worked continuously for twenty minutes and assure the treatment of 2-5 ares. They permit a more rapid achievment of the object required owing to the power of the flames, which reach, in both width and depth, from 0.5 metre to 0.75 metre and sometimes more. It must also be added that the process is not dangerous as the gas-oil does not ignite on contact with the flame, the apparatus is strongly made at least in its essential parts and is easy to handle, even by natives. It can be used without light for night work and is therefore also used to combat the adults.

It does not however, entirely avoid some disadvantages. Like all engines using fire, it really only represents an incomplete method and only partly destroys the hoppers. It must be used at a distance from forests and crops. Its cost price

is decidedly higher than if poisoned bait is used which, morevover, alone can give complete and final results. There are also some faults of the apparatus, which experience acquired during the last campaign will apparently make it possible to correct. The handling of the flame thrower at present requires two men : one to carry and the other to direct the nozzle, but the addition of a simple strap would render possible operation by one man. Two pumpings are indispensable for the complete utilisation of the liquid contained in the reservoir. It is also always necessary to have at hand on the land where the anti-locust operations are being performed a specialist capable of dismantling or rapidly repairing the apparatus. Despite the two filters with which it is provided, the diffuser frequently becomes choked, especially as gas-oil is a very impure fuel. Considerable loss of valuable time is incurred and most of the apparatuses of a single station may frequently be out of action for a rather long time. Lastly the pump valve fortunately modified in the latest engines delivered, is fragile and badly arranged.

When it has incorporated some modifications at present in course of realisation the " Dragon " will constitute, if the war flame throwers are excepted, the best fire apparatus so far placed at our disposal.

Climatic agents have, in many instances, caused the greatest destruction of locusts. At El Aricha, a swarm surprised last January by snowfall, was largely decimated ; rain and cold have similarly caused an interesting mortality of adults situated, at the beginning of March, near Victor-Duruy (Batna district).

Even if, in some rare districts having light soils, the rain has constituted an obstacle by forming round the eggs a homogeneous medium opposing destruction by heat, yet in many cases, the climatic agents have brought about an important reduction in the areas contaminated or in the density of the egg clusters.

In the commune of Sidi-Aïssa a drying-up of eggs has been noticed over large areas, due, undoubtedly, to sudden dryness of the soil and the action of the sun. The rain, which formed a deep water cover over the egg-clusters in the Affreville commune, caused their complete rotting. It also, by furrowing the sides and bottoms of the gullies, caused the washing away and mechanical destruction of eggs (mixed commune of Braz), or the exposure of the clusters, consequently permitting their rapid withering by the sun. A violent wind has sometimes (Barika, M'sila, Hodna region) provoked a similar action. On some heavy lands profusely cracked by the sun's action (North of the mixed commune of Sersou) the same observation has been made.

Numerous predatory animals during last season, played a similar rôle, but always to a limited extent. In many places destruction of adults has been recorded, the agents being the jackal, hedgehog, jerboa, different species of rats, crows and storks etc. This destruction however seems insignificant in comparison with that brought about by the true parasites, the endophagous insects.

The egg clusters were sought for by numerous birds, especially the lark, to such a degree that their presence at a given place indicated the certain presence of egg deposits (Tolga).

The hoppers have been the prey of innumerable small birds a list of which would be too long to make and would also vary considerably according to the region taken into account. The valuable rôle played by the swallow is specially worthy of remark.

From the rearing of adults accomplished at the " Insectarium du Jardin d'Essai " there have been obtained three species of parasitic flies for which recognition is due to Dr. Villeneuve of Rambouillet : *Sarcophila latifrons*, to which apparently, should be attributed the almost complete suppression of the first swarms, actually of low

* — *Mon. 6 Ing.*

density reported in the mixed commune of M'sila, *Vohlfarthia bella* and *Phaonia trimaculata*.

The part played by the latter two insects in the reduction of the invasion is, however, difficult to ascertain.

A fungus *Oospora ovorum*, the existence of which has been kindly confirmed by Dr. Maire, has shown great activity in numerous places, notably on compact soils the great humidity of which favours evolution (Marnia, Braz, etc.). It grows in the egg cluster, leading finally to its total destruction.

Two dipterous egg parasites have also been frequently observed : *Stomatorrhina lunata* and *Chortophila ciliciura*. The former has been by far the most widespread and efficacious. Its action has been particularly remarkable on the last layings and also on those which had a rather long period of incubation. Its destruction has sometimes attained 90-95 % (Trembles, Prudhon).

Scotland : Plant Diseases and Pests (1).

A disease of strawberries has occurred in the Clyde Valley. This is characterised by the plants dying gradually, first in single plants, then small round patches, finally whole fields succumbing. The leaves above ground wither but do not show any fungus. On examination at weekly intervals, it was found that the roots are attacked by a species of *Phytophthora*. This fungus causes the roots to rot off from the tip upwards. It is characterised by a large sporangium, by oospores of the two types and as far as has been ascertained is similar to *Phytophthora cinnamomi*. Field experiments on methods of control are being carried out by the Department of Agriculture for Scotland in the attacked area.

During 1930 there re-occurred a disease of Leeks known as ' White Tip ' and the causal fungus has been isolated in pure culture. The symptoms included a wilt and rot of the leaves, the tips in most cases turning white. The disease became acute in the winter season as in past years, but it was found to spread slowly, and not so rapidly as in previous years. The fungus is considered a new species and named *Phytophthora porri* n. sp. Work has shown that infection probably starts from the soil, the distribution afterwards being from the leaves.

One of the most striking diseases caused by a virus was seen on *Auratum* lilies during the summer of 1930. The flower spike grew quite as high as usual, in some cases 7 feet, and the stem was large and sturdy. The appearance of this disease was very striking, the lower leaves being more or less normal, but up the stem the leaves became more and more abnormal. They turned downwards and sometimes made a complete circle, the point again pointing upward. They were not actually shortened, but looked shortened owing to the twist. One side of the leaf was often more contracted than the other, and they were striped lengthwise with bands of light and dark, with brown or rusty dying areas as the leaf grew older. The leaves often had long, tapering points, were stiffer than usual, and snapped easily if handled. The flowers were markedly distorted, almost aborted and the flower parts were green, abnormal, and often split. Sometimes a few distorted stamens remained but seldom developed anthers and were twisted and deformed. The pistil was much twisted and sometimes split into two or three. The whole plant had a most curious abnormal air, and the green leaves were twisted and queer. The disease is spread

(1) Communication from the Department of Agriculture for Scotland, Edinburgh, official correspondent of the Institute.

by sucking insects such as Aphis who carry the virus from plant to plant, therefore the spread of the disease may be rapid.

The Edinburgh and East of Scotland College of Agriculture reports that there has been a great increase in recent years of damage to potatoes by Slugs Investigations on this question are now in progress.

On Azaleas recently imported from Belgium, the White Fly, *Aleurodes azaleae*, was recently discovered near Edinburgh for the first time in the British Isles. The infestation was small and no damage was being done. This insect was originally described from specimens intercepted on Azaleas from Belgium by the U. S. A. Quarantine Authorities.

The Onion Maggot, *Hylemyia antiqua*, has recently been discovered attacking spring-sown Leeks where these have been thinly sown and not transplanted.

In East Lothian, White Rot of Onion, *Sclerotium cepivorum*, has been unusually prevalent on Onions sown in July-August, 1930.

One case of Azalea Gall, *Exobasidium azaleae*, was recorded. The source of the infected plants was not known.

The North of Scotland College of Agriculture reports that an unusual symptom of the stem eelworm (*Tylenchus dipsaci*) disease of oats was recorded in May, 1930, wherein a young plant, 4 inches in height, revealed infection (adults, larvae and eggs) of the green leaves as well as the stem.

United States of America: Outstanding Entomological Features (1).

The present notes refer to March 1931.

The Hessian fly (*Phytophaga destructor* Say) is reported as comparatively scarce in Virginia and Ohio. On the other hand, in western and southeastern Iowa there appears to be a very heavy infestation.

Indications of possible chinch bug (*Blissus leucopterus* Say) trouble have been observed in central Illinois, central Missouri, and southeastern Kansas.

The first observation of eggs of the corn ear worm (*Heliothis obsoleta* Fab.) was reported from Galveston County, Texas, on February 10.

Local damage to peas, vetch, and alfalfa by the pea aphid (*Illinoia pisi* Kalt.) was reported from the Salt River Valley of Arizona and the Willamette Valley of Oregon.

Eggs of fruit aphids appear to be unusually scarce throughout the entire eastern part of the United States, westward to Kansas.

Throughout the Middle Atlantic States the codling moth (*Carpocapsa pomonella* L.) is abnormally abundant. The first observation of pupation was reported March 30 from South Carolina.

Throughout the New England and Middle Atlantic States the eastern caterpillar (*Malacosoma americana* Fab.) is not numerous. On the other hand, reports of unusual numbers of this insect have been received from Arkansas and Texas. By the 22d of March caterpillars were about full grown in the vicinity of College Station, Tex., and eggs were hatching on March 12 at Fayetteville.

The San Jose scale (*Aspidiotus perniciosus* Comst.) is apparently increasing in the Middle Atlantic States and the East Central States. A very high winter survi-

(1) Communication from the official correspondent of the Institute, Mr. J. A. Hyslop, Senior Entomologist in Charge, Insect Pest Survey and Public Relations, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

val is reported from Central Illinois running from 60 to 70 per cent., while in this district a normal survival is only from 25 to 30 per cent. Survival was also high in the Great Basin section.

The European red-mite (*Paratetranychus pilosus* C. & F.) is reported as unusually abundant in New England and very scarce throughout the Middle Atlantic States.

By March 27, approximately 7 per cent. of the overwintering larvae of the oriental fruit moth (*Laspeyresia molesta* Busck) had pupated at Thomaston, Ga., while we have a report of the emergence of this insect in cages in South Carolina on March 9.

The first overwintering adult of the plum curculio (*Conotrachelus nenuphar* Hbst.) was collected in an orchard at Thomaston, Ga., March 25. Last year the curculio was first observed at this place on March 17. At this time last year a thousand beetles were collected while only one was collected March 25 this year. Petals were falling from peach trees of the Hiley and Elberta varieties on this date and this advance of the peach crop as compared with the curculio emergence may make it possible to harvest Elberta peaches before the second brood appears. The plum curculio is also emerging later than usual in northern Florida.

Adults of the pear psylla (*Psylla pyricola* Foerst.) was observed on March 22 at Amherst, Mass.

The green citrus aphid (*Aphis spiraecola* Parch) is doing serious damage on the lower east coast of Florida and there are occasional heavily infested trees as far north as Marion County. Present indications are, however, that the damage will be light this year.

The cottony-cushion scale (*Icerya purchasi* Mask.) is again appearing in scattered infestations in the Salt River Valley of Arizona.

The vegetable weevil (*Listroderes obliquus* Gyll.) is spreading around the Gulf of Mexico, having been reported from four counties in Texas and four additional counties in Florida.

The western spotted cucumber beetle (*Diabrotica soror* Lec.) left hibernation quarters near Forest Grove, Oreg., January 25, practically a month earlier than last year. In spite of this early issuance egg development seems later than at this time last year. In March the adults were very numerous in Australian winter peas, all the specimens observed were females.

The first Colorado potato beetles (*Leptinotarsa decemlineata* Say) reported this season were from Biloxi, Miss., and College Station, Tex., March 21.

The cabbage aphid (*Brevicoryne brassicae* L.) is unusually abundant in the vicinity of Norfolk, Va., and in parts of South Carolina.

The beet leafhopper (*Eutettix tenellus* Bak.) is reported as very abundant in the Lewis Falls district of Idaho. Winter mortality appears to have been very light in this territory.

The California tent caterpillar (*Malacosoma californica* Pack.) is extremely prevalent around Phoenix, Ariz., this year, where it is defoliating cottonwood trees and severely injuring apricots.

The Birch leaf-mining sawfly (*Phyllotoma nemorata* Fallen) is reported from Essex County in New York, where it seems to be well established.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany (Bremen) (1). — By an Order of 31 March 1931 concerning the control of elm disease (*Graphium ulmi*) any owner or holder of land who shall observe elms growing on his land showing symptoms of the disease, such as sudden withering or yellowing of the leaves, branches or the whole trees, shall within a week notify the nearest police station.

The Plant Protection Station of Bremen is responsible for determining whether or not it is a case of elm disease.

The owner or holder shall on orders from the police according to the seriousness of the disease fell or cut back the infected trees. Cut surfaces of lopped trees shall be coated with tar or carbolineum. Felled branches must be burnt. Felled trees must have the bark removed and infected bark and branches burnt. Stumps of felled trees must be grubbed or, where this is impracticable, be coated with tar or carbolineum. Any new shoots which develop must be destroyed each year.

Any infringement of this Order will be punishable by a fine not exceeding 150 RM or in case of insolvency by imprisonment for a term not exceeding 14 days.

England. — The regulations at present in force (Colorado Beetle Order of 1923) against the introduction of the Colorado beetle [*Leptinotarsa decemlineata*] into this country prohibit the importation from France of potatoes, tomatoes and living plants grown within 40 kilometres of any place where the beetle has been known to exist.

The Colorado Beetle (Amendment) Order of 1931, dated 16th April, 1931, and which comes into force on May 4, 1931, extends the radius from 40 kilometres to 75 kilometres. (*Colorado Beetle (Amendment) Order of 1931. Dated 16th April, 1931.* (*D. I. P. 560*). [London, 1931], 1 p.).

*** The Importation of Raw Cherries Order of 1931, dated April 23, 1931, which comes into operation on June 3, 1931, and shall remain in force until September 30, 1931, enacts as follows :—

Restriction on Importation of Raw Cherries.

1. For the prevention of the introduction of the Cherry Fruit Fly [*Rhagoletis cerasi*] the landing in England or Wales after June 2, 1931, of any raw cherries grown in any European country other than France, Italy and, except as hereinafter provided, Germany, is hereby prohibited unless each consignment is accompained by a certificate of origin visé by a Local Authority in the country of origin stating the country and place where the raw cherries were grown.

The certificate prescribed in this Article shall be delivered to an officer of Customs and Excise at the same time as, and together with, the entry relating to the consignment.

(1) Communication from the Biologische Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, official correspondent of the Institute.

Restriction on Importation of Raw Cherries grown in France.

2. Raw cherries grown in France shall not be landed in England or Wales after June 2, 1931, unless accompanied by a certificate issued by an officer of the French Phytopathological Service in the form A set forth in the Schedule to this Order.

The certificate prescribed in this Article may cover all the consignments included in one cargo, and shall be delivered to an officer of Customs and Excise at the same time as, and together with, the entry relating to the consignment.

Restriction on Importation of Raw Cherries grown in Italy.

3. Raw cherries grown in Italy shall not be landed in England or Wales

(*a*) during the period beginning on June 6, 1931, and ending on the June 10, 1931, unless accompanied by a certificate issued by an officer of the Italian Phytopathological Service in the form B set forth in the Schedule to this Order;

(*b*) after June 10, 1931.

The certificate prescribed in this Article may cover all the consignments included in one cargo, and shall be delivered to an officer of Customs and Excise at the same time as, and together with, the entry relating to the consignment.

Restriction on Importation of Raw Cherries grown in Germany.

4. Raw cherries grown in Germany shall not be landed in England or Wales

(*a*) during the period beginning on June 3, 1931, and ending on June 29, 1931, unless each consignment is accompanied by the certificate of origin prescribed in Article 1 of this Order;

(*b*) after June 29, 1931, unless accompanied by a certificate issued by an officer of the German Phytopathological Service in the form C set forth in the Schedule to this Order.

The certificate prescribed in sub-paragraph (*b*) hereof may cover all the consignments included in one cargo, and shall be delivered to an officer of Customs and Excise at the same time as, and together with, the entry relating to the consignment.

Disposal of Raw Cherries landed in Contravention of this Order.

5. Raw cherries landed in England or Wales without such a certificate as is prescribed in this Order shall be forthwith destroyed by and at the expense of the importer unless they are re-exported or are disposed of in accordance with the terms of a licence issued by an Inspector.

Powers of Inspection and Entry.

6. An Inspector may, upon production, if so required, of this appointment or authority, open and examine and take samples of the contents of any consignment

or package containing or suspected to contain, raw cherries which have been shipped or are suspected to have been shipped, from any European country, and enter any premises upon which any such raw cherries are or are suspected to be.

Offences.

7. Any person wilfully obstructing or impeding an Inspector of the Ministry of Agriculture and Fisheries in the exercise of his powers under this Order, or failing to comply with the provision of Article 5 of this Order, or with the terms of any licence granted thereunder, shall be liable to a penalty not exceeding ten pounds, or, in respect of a second or subsequent offence, to a penalty not exceeding fifty pounds.

Schedule.

CERTIFICATE TO ACCOMPANY RAW CHERRIES GROWN IN FRANCE AND LANDED AFTER 2ND JUNE.

Form A.

This is to certify that the raw cherries included in the shipment described below were grown within the Zone described in the Schedule to this Certificate.

Number and description of packages in shipment . . . . . .
Date and Port of Shipment . . . . . .
Name of Vessel . . . . . .

Signature . . . . . .
Official Status . . . . . .
Date . . . . . .

Schedule.

DESCRIPTION OF ZONE.

The Department of Calvados, and the Cantons of Quillebœuf, Pont-Audemer, Beuzeville, Routot, Montfort-sur-Risle, Cormeilles, St. Georges-du Vièvre, Bourgtheroulde, Amfreville, Brionne, and Thiberville, in the Department of Eure.

CERTIFICATE TO ACCOMPANY RAW CHERRIES GROWN IN ITALY AND LANDED BETWEEN 6TH AND 10TH JUNE.

Form B.

This is to certify that the raw cherries included in the shipment described were grown within the Region of Emilia.

Number and description of packages in shipment . . . . . .
Distinguishing Marks. . . . . .
Date of Dispatch . . . . . .
Port of Shipment . . . . . .

Signature . . . . . .
Official Status . . . . . .
Date . . . . . .

CERTIFICATE TO ACCOMPANY RAW CHERRIES GROWN IN GERMANY AND LANDED AFTER 29TH JUNE.

Form C.

This is to certify that the raw cherries included in the shipment described below were not grown south of Latitude 53°N. or in East Prussia.

Number and description of packages in shipment . . . . . .
Distinguishing Marks . . . . . .
Date of Dispatch . . . . . .
Port of Shipment . . . . . .

Signature . . . . . .
Official Status . . . . . .
Date . . . . . .

(*Statutory Rules and Orders, 1931, No. 332. Destructive Insect and Pest, England. The Importation of Raw Cherries Order of 1931. Dated April 23, 1931.* [*D. I. P. 561*]. London, 1931, 4 pp.).

Belgium (1). — By Ministerial Decree of 27 March 1931 Art. 1 of the Ministerial Decree of 28 June 1927 (see this *Bulletin*, 1927, pp. 94-95) is modified as follows:—

'Importation into Belgium of fresh cherries coming from France, Italy and Germany is allowed only if consignments are accompanied by a certificate issued by the Phytopathological Service of the country of origin to the effect that: (*a*) the products come from a region free from *Rhagoletis cerasi* and (*b*) the consignments themselves have been found by the said Service to be free from *Rhagoletis*'.

French Colonies and Mandated Territories. — By Ministeral Decree of 11 February 1931 paragraph 1 of Art. 6 of the Ministerial Decree of 7 December 1926 concerning the protection of banana plantations in the French Colonies against 'Panama disease' caused by *Fusarium cubense* has been modified and completed as follows:—

"Article 6. — The provisions of the present Ministerial Decree are applicable to banana plants delivered for importation or transit in the French Colonies other than Indochina and the French Mandated Territories hereinafter specified: — French West Africa, French Equatorial Africa, Madagascar and Dependencies, Réunion, New Caledonia and Dependencies, French Settlements in Oceania, French Guiana, Martinique, Guadeloupe and Dependencies, Togo and Cameroon". . . . . .

. . . . . .

(Ministère des Colonies. Institut National d'Agronomie Coloniale. *L'Agronomie Coloniale*, Paris, 1931, 20e année, nº 158, p. 55-56).

Italy. — By Ministerial Decree of 12 April 1931 the Commune of Santa Croce di Magliano in the province of Campobasso has been declared infected with grape phylloxera, (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 22 aprile 1931, anno 72°, n. 92, p. 1781).

(1) Communication from the Ministry of Agriculture to the International Institute of Agriculture.

*** In view of the necessity of providing for the control of the mole cricket [*Gryllotalpa gryllotalpa*] in the province of Rovigo, by Ministerial Decree of 30 April 1931 the regulations prohibiting the trapping and killing of moles [*Talpa europaea*] which were legalised by Ministerial Decree of 28 March 1928, have been extended to this province. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 13 maggio 1931, anno 72°, n. 110, p. 2115).

Morocco French Zone. — A Ministerial Decree of 4 April 1931 (15 kaada 1349) provides as follows :—

Art. 1. — The administrative districts of Oujda and Taza are declared infected with the pink bollwarm of cotton (*Pectinophora gossypiella* Saunders).

Art. 2. — Within the limits of the infected districts cotton may not be cultivated or allowed to remain in growth for three years from the date of publication of this Decree in the *Bulletin Officiel* of the Protectorate.

Art. 3. — Cotton seed existing within the limits of the infected districts must be immediately destroyed or exported for industrial utilisation.

Art. 4. — Cotton plants, leaves, bolls, unharvested seeds and all débris of cotton plants in the infected districts must be destroyed without delay.

Art. 5. — In the case of owners, holders or other occupiers of land not carrying out the orders contained in the preceding articles the required measures will be officially executed at their expense by the control authorities or their agents, without prejudice to the application of the penalties provided in article 31 of the dahir of 20 September 1927 (23 rebia I 1346).

Art. 6. — The provisions of the present Decree, in particular those of Arts. 2 and 4, are applicable to all species of the genera *Gossypium*, *Hibiscus*, *Abutilon*, *Malva* and all other genera of the Malvaceae, whether the plants are of economic or ornamental use or are growing in crops, pasture, gardens or other places.

Art. 7. — These regulations do not apply to plants grown by the District Crop Protection Inspector or, in his default, by any agent duly authorised by the Directeur général de l'Agriculture, du Commerce et de la Colonisation, for purposes of control of the pink bollworm. (Empire Chérifien. Protectorat de la République Française au Maroc. *Bulletin Officiel*, Rabat 17 avril 1931, XX^e année, n° 964 p. 497).

Wales. — See England.

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[*Cercospora personata* (B. et C.) E. is up to the present the only species of the genus definitely known to be parasitic on *A. hypogaea*. *Septogloeum Arachidis* Rac. and *C. Arachidis* P. Henn. must be regarded as synonyms of *C. personata*. *C. Arachidis* var. *macrospora* Maff. must be distinguished from *C. personata* in the want of a careful comparative study].

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[*Glomerella rufomaculans*, *Alternaria Solani* f. *Symphoricarpi* n. f., *Botrytis vulgaris* on *Symphoricarpos albus*. Description of the new form in English].

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[*Acheta campestris*, *Aphis gossypii*, *Pantiliodes* (*Creontiades*) *pallidus*, *Oxycarenus hyalipennis*, *O. lavaterae*, *Prodenia littoralis*, *Earias insulana*, *Heliothis obsoleta*, *Pyroderces simplex*, *Pectinophora gossypiella*].

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[*Cronartium ribicola*].

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[Virus disease attacking *Vaccinium macrocarpon* Ait. and transmitted by *Euscelis striatulus* (Fallen)].

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[In Dutch, with summary in German].

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[*Brachytrupes membranaceus* var. *colosseatus*, *Phymateus saxosus*, *Lachnodius greeni*, *Lecanium viride*, *L. hemisphaericum*, *Xenotyngis* sp., *Xyleborus coffeae*, *Araeocerus fasciculatus*, *Gracilaria coffeifoliella*, *Cemiostoma coffeella*, *Tuliptoceras octoguttalis*].

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[*Aecidium elatinum*, *Trametes Pini*, *Polyporus annosus*, *P. fomentarius*, *Agaricus melleus*, *Viscum album*, 'Harzgallen' (Pechtaschen), 'Schwarzästigkeit', 'Zwieselstämme', 'Drehwüchsigkeit', etc.].

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[A description is given in Spanish of *Aphytis abnormis* (Howard) obtained at Antibes, France as an ecto-parasite of the scale *Leucaspis signoreti*].

GRANDI, GUIDO. *Hypopta caestrum* Hbn. (4º Contributo alla conoscenza biologica e morfologica dei Lepidotteri). *Bollettino del Laboratorio di Entomologia del R. Istituto Superiore Agrario di Bologna*, Bologna, 1930, vol. III, pp. 221-245. figg. I-IX, tav. III.

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[*Blitophaga opaca* L., *Bl. undata* Müll., *Silpha obscura* L.].

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[10 species are listed, amongst which the following are new to science: *Septoria Abeliceae* on *Abelicea hirta*; *Sept. Asteromoea-Savatierii* on *Asteromoea Savatieri*; *Sept. Ecliptae* on *Eclipta alba*; *Sept. Glechomae* on *Glechoma hederacea*. Diagnoses of the new species are given in Latin].

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[*Diaporthe umbrina*].

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[Contents :— I. Der Autor des Cronartium ribicola. — II. Versuche, Puccinia Pringsheimiana an Ribes nigrum anzupassen. — III. Bestätigung des Wirtswechsels der Puccinia triticina. — IV. Vergebliche Versuche, Rostsporen in ultrafiltrierten Pressaft zur Entwickelung zu bringen. — V. Puccinia sweertiae. — VI. Hyalospora cystopteridis. — VII. Anhang. Ein Versuch mit Ustilago longissima].

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[Virus disease transmitted by *Cicadula sexnotata* on 120 new hosts belonging to 30 different families].

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[*Fusicladium dendriticum*].

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[Latin diagnoses are given of various species new to science, certain of which are plant parasites].

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[The writer states that in 1930 in the province of Padua, Italy, the best control of *Rhagoletis cerasi*, was obtained by spraying with the following mixture :— lead arsenate paste, 1 kg.; molasses, 3 kg.; water, 100 litres].

MATSUMOTO, TAKASHI, and SOMAZAWA, KÔETSU. Immunological studies of mosaic diseases. 1. Effect of formolization, trypsinization and heat-inactivation on the antigenic properties of tobacco mosaic juice. *Journal of the Society of Tropical Agriculture*, Taiwan (Formosa), Japan, 1931, Vol. III, No. 1, pp. 24-32.

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[For the control of *Oidium Tuckeri* crude sulphurs can be substituted for pure].

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[*Locusta migratorioides*].

Menozzi, C. Norme per la lotta contro il punteruolo (*Cleonus mendicus*) della barbabietola. (Consorzio Nazionale Produttori Zucchero. Ufficio Entomologico). Genova, Tipo-Litografia Narcisi & C., 1931, 7 pp., 2 figg.

Menozzi, Carlo. Informazioni sui danni causati da insetti alla barbabietola durante la campagna saccarifera 1930 e sulla lotta contro di essi. *L'Industria Saccarifera Italiana*, Genova, 1931, anno XXIV, n. 2, pp. 50-54.
[*Cleonus mendicus*, *Cassida vittata*, *C. nobilis*, *Chaetocnema tibialis*, *Pegomyia hyoscyami*; less serious damage is caused by mole crickets, by *Pentodon punctatum*, *Cebrio* sp., *Lixus junci*, *L. scabricollis*, etc.].

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[*Tilletia Tritici*, *T. laevis*].

Miles, Herbert W. The control of the cabbage root fly. *The Journal of the Ministry of Agriculture*, London, 1931, Vol. XXXVII, No. 12, pp. 1127-1231, figs. 1-4.
[*Chortophila brassicae*].

Mitra, M. A new bunt on wheat in India. *The Annals of Applied Biology*, Cambridge, 1931, Vol. XVIII, No. 2, pp. 178-179, fig. 1, pl. XV.
[*Tilletia indica* n. sp. Description in English].

Montoro Guarch, Arturo. La Puccinia glumarum Eriks. et Henn. y una relación fito-patológica de un viaje de estudio realizado por las colonias del litoral uruguayo. *Universidad de la República. Revista de la Facultad de Agronomia*, Montevideo, 1931, n.º 4, págs. 203 a 211.
[In Spanish, with title and summary in French].

Murphy, H. C., and Stanton, T. R. Oat varieties highly resistant to crown rust. *Journal of the American Society of Agronomy*, Geneva, N. Y., 1930, Vol. 22, No. 6, pp. 573-574.
[Varieties «Victoria», « Avena ¦Victoria » and *Avena strigosa* var. *glabrescens* highly resistant to *Puccinia coronata Avenae* in the United States of America].

Nakamura, Hisao. Studies on septorioses of plants. III. On *Septoria Callistephi* Glover pathogenic on the China aster. *Memoirs of the College of Agriculture, Kyoto Imperial University*, Kyoto, Japan, 1931, No. 13, pp. 23-32, figs. 1-2, pl. III.

Neuwirth, F. Beziehung der Rübennematode Heterodera Schachtii Schmidt zur Ernährung der Zuckerrübe. *Die Ernährung der Pflanze*, Berlin 1930, Bd. 26, Heft 23, S. 526-532, Abb. 1-7.

Nicolas, G. Un parasite dangereux pour le blé en Béarn, « Septoria glumarum Passer. ». *Comptes rendus des séances de l'Académie d'Agriculture de France*, Paris, 1930, tome XVI, nº 7, p. 250-255.

Nieves, Raimundo. Contribución al conocimiento de la « caries » del trigo (Tilletia sp.). — Sus caracteres biológicos. — Su comportamiento genético. — Bases para la creación de variedades resistentes. *Revista de la Facultad de Agronomia*, La Plata, 1930, tomo XIX, nº 2 (3ª época), págs. 211 a 230. Bibliografía citada, págs. 228 a 230.

Ogloblin, Alejandro. Informe preliminar sobre un nuevo parásito del trigo. *República Argentina. Boletín del Ministerio de Agricultura de la Nación*, Buenos Aires, 1930, tomo XXIX, n.º 4, págs. 451 a 455, figs. 1-9.

[A Curculionid not yet identified, observed as yet only in the larval state].

Pampanini, R. Prodromo della Flora Cirenaica. Maugini, A. Contributo alla conoscenza dei prati e pascoli naturali della Cirenaica Settentrionale. Forlì, Tipografia Valbonesi, 1931, pp. 6 non numerate + XXXVIII + 665, 1 cartina, 4 figg., tav. I-VI. Bibliografia, pp. 517-527.

[Part I of the present volume (pp. XXXVIII + 577, 1 map, 4 figs., 6 pls.), drawn up by the former of the two authors, contains on pp. 41-58 a list of the 130 fungi collected up to the present in Cirenaica].

Parker, H. L. Macrocentrus gifuensis Ashmead, a polyembryonic Braconid parasite in the European corn borer. *United States Department of Agriculture, Technical Bulletin No. 230*, Washington, D. C., 1931, 62 pp., 21 figs., 1 pl. Literature cited, pp. 61-62.

[The species concerned is a parasite of *Pyrausta nubilalis*].

Petherbridge, F. R., and Hey, G. L. The control of the common green capsid bug on red currants. *The Journal of the Ministry of Agriculture*, London, 1931, Vol. XXXVII, No. 12, pp. 1185-1188.

[*Lygus pabulinus*].

Petrak, F., und Ciferri, R. Fungi dominicani. *Annales Mycologici*, Berlin 1930, Vol. XXVIII, No. 5/6, S. 377-420.

[Descriptions are given in German *inter alia* of 1 genus and 38 species new to science].

Petri, L. Osservazioni sulla variegatura delle foglie del grano. *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1931, anno XI, n. ser., n. 1, pp. 98-104, figg. 1-3.

[The observations suggest that the phenomenon is due to internal factors (special susceptibility in certain varieties of wheat to the action of moist cold on the leaf tissue in spring when it is still in the embrionic stage) and to external factors. Among the latter moist cold in spring coinciding with a particular stage of growth of the plants must be taken into particular consideration].

Petri, L. Rassegna dei casi fitopatologici osservati nel 1930. *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1931, anno XI, n. ser., n. 1, pp. 1-50.

[Diseases and pests observed in Italy and the Italian Colonies in Africa. Certain cases observed in Yugoslavia are also recorded].

Petri, L. Sull'« arricciamento » della vite. *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1931, anno XI, n. ser., n. 1, pp. 61-83, figg. 1-11, tav. I.

[The « arricciamento » (curling ; ' court-noué ' of the French) is, according to the writer, an infectious disease but not caused by ordinary parasitic organisms. In the present stage of investigations it may perhaps be attributed to a micro-organism, the ultramicroscopic and filterable (virus) stage of which is diffused in the cambium and the reproductive stage (visible under the ordinary microscope) develops in the root tips].

Pfältzer, A. Experiments and observations in connection with the control of Oidium in Hevea brasiliensis during 1930. *Archief voor de Rubbercultuur in Nederlandsch- Indië*, Buitenzorg 1931, 15e jaarg., no. 3, blz. 147-169, fig. 1-7.

[In Dutch, with title and summary in English].

Pinolini, D. Di una malattia del frumento. *Giornale di Agricoltura della Domenica*, Piacenza, 1931, anno XLI, n. 19, p. 213.

[An unexpected fall in temperature is probably the chief cause of the withering observed in the province of Macerata].

Pinto da Fonseca, José. Uma cochonilha nociva ao cafeeiro. *O Campo*, Rio de Janeiro, 1931, anno II, n.os 1 e 2, pags. 87-88, fig.

[*Coccus viridis*].

Prell, H. Die nadelknickende Kiefergallmücke (*Cecidomyia Baeri* n. sp.), ein verbreiter neuer Kiefernschädling. *Tharandter Forstliches Jahrbuch*, Berlin 1931, 82. Bd., Heft 1, S. 36-52, Fig. 1-5.

Preti, Giacomo. Di una forte infezione di Nematodi nei bulbi di Iris. *Nuova Antologia Agraria, Enologica e Fitopatologica*, Alba, 1931, anno II, n. 16, pp. 69-70, 2 figg.

Puppini, Giuseppe. Contributo alla conoscenza dell'*Anarsia lineatella* Zeller e appunti sulla *Recurvaria nanella* Hübn. *Bollettino del Laboratorio di Entomologia del R. Istituto Superiore Agrario di Bologna*, Bologna, 1930, vol. III, pp. 182-220, figg. I-XVIII, tav. I-II. Bibliografia, pp. 216-219.

Quilis Pérez, M. Especies nuevas de *Aphidiidae* españoles (Hym. Brac.). *Eos*, Madrid, 1931, tomo VII, cuad. 1.º, págs. 25 a 84, figs. 1 a 98.

[Descriptions are given in Spanish of 1 sub-family, 2 genera, 18 species and 3 varieties new to science. The *Aphidiidae* destroy the aphides which injure plants].

Ramakrishnan, T. S. A leafspot disease of *Andropogon Sorghum* caused by *Cercospora sorghi* E. & E. *Memoirs of the Department of Agriculture in India*, Botanical Series, Calcutta, 1931, Vol. XVIII, No. 9, pp. 259-277, figs. 1-6, pls. I-IV.

Ramón y Acosta, Domingo. Investigaciones fitopatológicas. *Universidad de la República. Revista de la Facultad de Agronomía*, Montevideo, 1931, n.º 4, págs. 74 a 90.

[In Spanish, with title and summary in French. 47 species of fungi are listed].

Reed, I. F., and Humphries, W. R. Husker-shredders in cornborer control. *U. S. Department of Agriculture, Farmers' Bulletin No. 1662*, Washington, D. C., 1931, 16 pp., 17 figs.

[*Pyrausta nubilalis*].

Riehm, E. Pflanzenschutz-Praktikum. Berlin, Verlag von Paul Parey, 1931, VII + 100 S., 45 Abb.

Rieman, G. H. Genetic factors for pigmentation in the onion and their relation to disease resistance. *Journal of Agricultural Research*, Washington, D. C., 1931, Vol. 42, No. 5, pp. 251-278, pls. 1-3.

[*Colletotrichum circinans*].

Ruggieri, G. Note tecniche sul « mal secco » degli agrumi. *Citrus*, Messina, 1931, anno XVII, ser. II, n. 4, pp. 91-95, figg. I-IV.

[*Deuterophoma tracheiphila* Petri].

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NOTES

International Competition for the Control of two Diseases of Cacao. — The Ecuador Government has announced an international competition for the discovery of a simple, economic and effective method for the prevention and cure of the two principal diseases of cacao in the Republic, which are known locally as 'escoba de la bruja' [witches' broom] and 'monila' [*Monilia* disease]. The individual or institution discovering such a method will be awarded a million 'sucres'.

Prof. ALESSANDRO BRIZI, *Segretario generale dell'Istituto, Direttore responsabile.*

DISCOVERIES AND CURRENT EVENTS *

Algeria : *Rhizoctonia Medicaginis* (1).

Rhizoctonia Medicaginis DC. has made its appearance in lucerne crops in two places in Algeria where at present it remains localised.

It is a new disease for North Africa.

Canada : Plant Diseases in 1930 (2).

The following account prepared by Mr. I. L. Conners, a member of the staff of the Dominion Botanist, is a brief resumé of the observations made on the more important plant diseases in the Dominion of Canada in 1930.

Stem rust (*Puccinia graminis* Pers.) was destructive in Manitoba and eastern Saskatchewan. It was estimated that the losses in Manitoba were : common wheat, 5 to 10 per cent of the crop ; oats, 5 per cent ; barley, under 5 per cent ; durum wheat and rye, no loss.

Stripe rust (*Puccinia glumarum* (Schm.) Erikss. & Henn.) was found on wheat in southern Alberta, but it caused no damage. This rust has also been collected on wheat in British Columbia and along the western boundary of Saskatchewan. Climatic conditions apparently prevent its spread beyond this area. It frequently attacks *Hordeum jubatum* L. but it is very rarely collected on barley.

Limited observations demonstrated the importance of the common buckthorn (*Rhamnus cathartica* L.) in initiating epidemics of leaf rust of oats (*Puccinia coronata* Cda.) in eastern Ontario. Oats growing adjacent to cultivated or escaped bushes were heavily rusted, while at a distance only traces of rust were present.

Wheat bunt has been increasing in destructiveness within recent years in the Prairie Provinces. Of the cars of wheat inspected in the three months ending Oct. 31, 1930, 1.7 per cent of the common spring and 16.6 per cent of the durum respectively were graded smutty. The durum wheat is infected almost exclusively with *Tilletia Caries* (DC.) Tul., while both species are present in common wheat, *Tilletia*

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* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Communication from the official correspondent of the Institute, Dr. R. Maire, Professor of Botany in the University and Director of the Botanical Service of the General Government of Algeria, Algiers.

(2) Communication from the official correspondent of the Institute, Mr. H. T. Güssow, Dominion Botanist, Dominion Department of Agriculture, Ottawa, Canada.

foetens (Berk.) Trel. predominating to some extent in the southern part of each province.

Loose smut of wheat (*Ustilago Tritici*) (Pers.) Jens.) was comparatively rare in British Columbia and Alberta, but it was fairly prevalent in Manitoba and Ontario. In Manitoba the average loss was estimated to be six-tenths of one per cent. Loose smut of barley (*Ustilago nuda* (Jens.) Rostr.) showed a similar distribution.

Covered smut of barley (*Ustilago Hordei* (Pers.) Kellerm.) was extremely common and caused some damage in the Prairie Provinces.

Although both smuts on oats occur throughout Canada, covered smut (*Ustilago levis* (Kellerm. & Swingle) Magn.) is a common and destructive disease from Alberta to Ontario, while loose smut (*Ustilago Avenae* (Pers.) Jens.) is more prevalent in the other provinces of Canada.

An outbreak of stem smut of rye (*Urocystis occulta* (Wallr.) Rabh.) occurred in Saskatchewan. As high as 11 per cent of the plants were infected in some fields. This smut, however, is rare in Canada.

Take-all (*Ophiobolus graminis* Sacc.) was more abundant and more widely distributed on wheat in Alberta this year than in 1929. It was particularly prevalent on the black soils in central Alberta and to less extent on similar soils in the south. Take-all was also reported from British Columbia, Saskatchewan and Manitoba.

Browning root rot, caused by *Pythium* spp., was destructive to wheat in Saskatchewan, on land summer-fallowed the previous year. It was not as severe, however, this year as in the wetter season of 1928.

Foot and root rot caused by *Helminthosporium sativum* P. K. & B. and *Fusarium* spp. is very prevalent and caused some damage in the Prairie Provinces.

Wilt, caused by *Sclerotinia sclerotiorum* (Lib.) de Bary, was locally destructive throughout Canada. In a test of 450 pure lines of sunflower to wilt at Kentville, N. S., infection varied from nothing to 70 per cent.

The growing of potatoes for seed is an important industry in Canada especially in the Maritime Provinces. To be sold as seed the potatoes must pass a rigid inspection in the field and in the bin before they may be certified. Of the fields, which were planted with certified seed and inspected, 24.8 per cent were rejected on account of disease or other causes. Of the fields rejected 53 per cent contained more mosaic than the standards permit. Similarly, 9.4 per cent were rejected on account of black leg, 5.6 per cent on account of leaf roll and 11.6 per cent on account of being adjacent to diseased fields. While the number of fields rejected on account of mosaic closely parallels the number of fields inspected each year the number rejected for other causes has gradually decreased since seed certification became firmly established. In consequence mosaic is assuming more and more importance in the production of certified seed potatoes.

Apple scab (*Venturia inaequalis* (Cke.) Wint.) caused some loss in almost all the important apple growing districts of Canada, but the damage was less than in 1929 on account of the hot, dry weather. The disease is particularly destructive on some of the important varieties such as McIntosh and Fameuse.

Although fire-blight (*Bacillus amylovorus* (Burr.) De Toni was present in many of the apple growing districts, it was only severe in Quebec in 1930. It was particularly prevalent in four out of the eight apple districts of western Quebec. The disease was especially destructive in the Abbotsford district, where it appeared in the form of blossom blight. In the other districts the disease was less and twig blight was more common.

A tree-to-tree survey of the Okanagan valley was completed last year for perennial canker of apple (*Gloeosporium perennans* Zeller & Childs). It was found that

the disease was in general, more severe on varieties prone to winter injury, which are already no longer recommended for planting for this reason. Naturally the disease is more severe on the older planted varieties and with the control of woolly aphis it is believed that the disease will be fully held in check in the Okanagan valley. It may be pointed out that perennial canker is unknown in the lower Fraser valley, where the climate is typically coastal.

Bacterial fruit blight, a new and destructive disease of loganberry, was discovered on Vancouver Island and in the lower Fraser Valley, B. C. Foster (Sci. Agr. 11:529-534, 1931) has named the causal organism *Bacillus desiccans* n. sp. Besides loganberry (*Rubus loganobaccus* Bailey) he found the wild blackberry (*R. macropetalus* Dougl.) and the thimbleberry (*R. parviflorus* Nutt.) infected. He also successfully inoculated the immature fruits of the raspberry (*R. Idaeus* L.).

Egypt: Occurrence and Movements of Locusts *(Schistocerca gregaria)* (1).

On March 17th 1931, locusts appeared at Halfa coming from the S. E. They did not penetrate into Egypt and soon returned to the South.

Two days later a swarm was reported from Keresko and Singari in the far South proceeding Northwards. On the 20th it flew Eastwards and disappeared in the desert.

Most probably both originated from Halaib where, according to the Sudan reports, the Desert locust was breeding during the preceding month.

Camel patrols scouted the desert East of Assuan Province.

On the 11th a specimen of dragon flies was received from the Frontier's Inspector at Hurgada on the Red Sea Coast. They came in a swarm from the South assisted by a strong South wind.

On the 22nd some dragon flies appeared at Abbasieh (Caire Governatorate); they were mistaken for locusts.

On April 15th Transjordania reported the arrival of two swarms of mature locusts believed to have come from the South. They laid no eggs. Fresh arrivals appeared on the 16th and 21st, some in Palestine.

Their appearance in Sinai was expected and this actually happened on the 21st when a swarm of yellow coloured invaders (500 metres long and 50 metres wide) was seen flying near Bir el Maloh going S. W.

Next day a smaller swarm crossed Akaba Gulf to the West while two others were reported from Ras el Nagb and Wadi el Gubi both going Westwards. The swarms of Wadi el Gubi contained few red locusts. On the 24th locusts occupying an area of 100 × 20 metres were discovered at Wadi el Khamila. On the 27th and 28th locusts reached the South Western part of the Peninsula.

Up to the end of April no locusts reached the Nile Valley.

Sinai Governatorate, the Frontier Posts in the Eastern Desert and the Provinces were all informed of the situation and warned of an expected invasion.

A locust officer proceeded to El Arish where he demonstrated to the F. D. A. soldiers on the proper use of flame guns, made a tour which covered the greater part of the Peninsula and helped in combatting some mature locusts found at Wadi el Khamila.

Patrols were arranged by Sinai Governatorate to scout different regions.

(1) Communication from the Chief Plant Pathologist, Plant Protection Section, Ministry of Agriculture, Cairo, Egypt, to the International Institute of Agriculture.

Four car patrols from the Ministry of Agriculture with flame guns and kerosine were stationed at four posts on the Canal and Suez Gulf to be on the look out and destroy any locusts that might appear.

About 1000 flame guns, remaining from last year's campaign and 500 tons of poisoned bran bait were kept in the Plant Protection stores ready for despatch.

Eritrea: Locusts *(Schistocerca gregaria)* (1).

On March 6, 1921 dense swarms of locusts yellow in colour, after having passed over the zones of Sabarguma, Gudum, Malachia and Dembib, flew in the direction of Ailet to deposit eggs in that territory.

Numbers of other locusts alighted on the 9th near Dubellò in the island of Dalach Chebira ; on the 10th they resumed their flight towards the Arabian coast.

On the 12th a few locusts coming from the south deposited egss near Naro in the valley of Almeda.

On the 14th, 15th and 16th egg deposits were reported in the zones of Damas, Mai Atal, Sabarguma, Ailet, Agambussa, Adì Acebze and Zula.

Between the 15th and the 18th several swarms coming from Dancalia in Abyssinia were reported in Eritrea between Uaddi and Mabra.

On the 23rd numerous hoppers (' cucubtà ') made their appearance in the territory of Ailet and towards the end of the month other breeding centres were reported in Asus and Gumot, in the Agambussa and near Zula, along the Red Sea coast.

The extensive regions of the eastern plain infested with ' cucubtà ' were crossed and searched by a number of special gangs under white direction who destroyed with poisoned bait the numerous breeding centres reported in the various regions.

In consequence of information supplied by fishermen and island and coast dwellers and also by the Vice Resident of Northern Dancalia (Mersa Fatma) it may be definitely stated that the swarms reported on 19 and 20 January in Dancalia and between 10 and 24 February in the eastern plain (cf. this *Bulletin*, 1931, No. 4, p. 53 and No. 5, p. 74) all came from the coast of Arabia.

United States of America: Outstanding Entomological Features (2).

The present notes refer to April, 1931.

The usual reports of more or less serious cutworm (Noctuidae) damage was received from practically all parts of the United States. Unusual damage by these insects was reported from North Carolina, North Dakota, Nebraska, Montana, and parts of Idaho.

Serious Hessian fly (*Phytophaga destructor* Say) infestations are reported from western Illinois, part of the Platte Valley in Nebraska, and limited areas in Iowa. In Henderson County, Illinois, considerable wheat is being plowed out on account of infestation.

During the middle of April the chinch bug (*Blissus leucopterus* Say) started mi-

(1) Communication from the official correspondent of the Institute, Dr. A. De Benedictis, Capo dell'Ufficio Agrario della Colonia Eritrea, Asmara.

(2) Communication from the official correspondent of the Institute, Mr. J. A. Hyslop, Senior Entomologist in Charge, Insect Pest Survey and Public Relations, Bureau of Entomology, United States Departement of Agriculture, Washington, D. C.

grating into the fields in Illinois. By the middle of the month migration was observed in Missouri and Kansas. There is a decided indication of serious chinch bug trouble in southeastern Kansas.

The clover leaf weevil (*Hypera punctata* Fab.) is reported as very abundant in central Illinois and parts of Iowa, Missouri, Kentucky, and Kansas.

The pea aphid (*Illinoia pisi* Kalt.) is reported in outbreak numbers in parts of Kansas, northeastern Arkansas, Arizona and Southern California. Isolated infestations were reported from Mississippi. The infestation reported from the Willamette Valley of Oregon increased materially during late March.

Damage by the shot-hole borer (*Scolytus rugulosus* Ratz.) is reported to be unusually severe in Ohio this spring. In view of the very extensive and serious drought of 1930, it is surprising that severe damage by this insect is not more extensively observed.

The first record for 1931 of the pupation of the codling moth (*Carpocapsa pomonella* L.) was made in Missouri on April 3; at Cornelia, Georgia, April 15; at Carbondale, Ill., April 12; at Urbana, Ill., April 14; in Nebraska, April 13; in Pennsylvania, April 21; and in Maryland, April 21. The insect is quite generally reported as normally abundant throughout the Middle Atlantic, South Atlantic, and East Central States. In the Rocky Mountain region the insect is reported as very abundant in New Mexico, and as having sustained a very slight mortality in Idaho.

The Eastern tent caterpillar (*Malacosoma americana* Fab.) appears to be normal in numbers throughout the New England, Middle Atlantic, and South Atlantic States.

Deciduous fruit aphids are reported as quite generally below normal in numbers along the Atlantic Seaboard from Massachusetts to Georgia, and westward to Missouri. Reports of an unusual abundance of deciduous fruit aphids have been received from Mississippi. A limited heavy infestation of the apple grain aphid (*Rhopalosiphum prunifoliae* Fitch) is reported from New York State, and owing to the unusually mild winter the woolly apple aphid (*Eriosoma lanigerum* Hausm.) was as numerous during the first week of April in Wanatchee, Wash., as they were in July of last year.

Apple leafhoppers are reported as unusually abundant in Connecticut and the East Central States. They are so numerous in parts of Missouri that the fruit growers are becoming alarmed.

The first emergence of the oriental fruit moth (*Laspeyresia molesta* Busck.) to be reported from Georgia was on April 8, at Thomaston. Adults were observed at Roanoke, Va. on April 14.

A very heavy migration of the common red spider (*Tetranychus telarius* L.) into fruit trees in western Washington indicates that the very serious outbreak of last year may be repeated this season.

The plum curculio (*Conotrachelus nenuphar* Hbst.) appears to be delayed in emergence in the South Atlantic States. Only 3 beetles were collected at Thomaston prior to April 4, on which date 35 adults were collected in two hours by jarring. This is about three weeks later than general emergence last year and the latest emergence in 11 years. Adults were observed for the first time on April 14 in Virginia and southern Illinois, and on April 15 in Kentucky.

Heavy infestations by the rusty plum aphid (*Hysteroneura setariae* Thos.) are reported from Georgia and Mississippi.

The grape leafhopper (*Erythroneura comes* Say) is more abundant than usual in the commercial grape sections of northern Ohio. Damage from this insect is more abundant than ever before recorded in the San Joaquin Valley, California,

* *Mon. 7 Ingl.*

and in the central part of the Valley the insects are so numerous that the small leaves are turning brown.

A severe outbreak of the six-spotted mite (*Tetranychus sexmaculatus* Riley) has occurred over the entire citrus belt of Florida and some defoliation has resulted where spraying has been neglected.

The vegetable weevil (*Listroderes obliquus* Gyll.) continues to be a serious pest on a variety of truck crops in Mississippi.

The first adult of the spotted cucumber beetle (*Diabrotica duodecimpunctata* Fab.) to be observed in Virginia this season was seen at Norfolk on April 3, and the first adult was reported from Illinois on April 15.

The western spotted cucumber beetle (*Diabrotica soror* Lec.) is making serious inroads on fields of seedling clover in the Willamette Valley of Oregon, and is doing considerable damage to melons in the San Joaquin Valley of California.

The Colorado potato beetle (*Leptinotarsa decemlineata* Say) is reported as unusually abundant in the Chadbourn district of North Carolina, and in the Norfolk district of Virginia. There is also quite a heavy infestation by this insect as far south as Alachua County of Florida.

The seed corn maggot (*Hylemyia cilicrura* Rond.) is not so serious as usual on potato seed pieces in the trucking sections of Virginia and the Carolinas, although it is reported as causing considerable damage to snap beans in North Carolina, and doing considerable damage to corn, peas, and beans in western Texas.

The cabbage webworm (*Hellula undalis* Fab.) became so numerous on turnip greens about Lucedale, Miss., that canning operations had to be suspended.

Large quantities of spinach harvested early in April had to be rejected on account of the unusually heavy infestation by the green peach aphid (*Myzus persicae* Sulz.) in the Norfolk district of Virginia.

The first adult of the harlequin bug (*Murgantia histrionica* Hahn.) to be observed in Virginia this season was collected April 9. The first specimen observed in the Chadbourn district of North Carolina was recorded as of April 21.

Italy: New Observations (1).

F u n g i . — During last winter and the spring of the present year no new diseases of crop plants were reported, but here and there there were further outbreaks of varying severity of those already noted ; these were favoured for the most part by the somewhat unseasonable weather in various parts of Italy, in which mild periods alternated with periods of cold and rain until and throughout May.

The wheat has been and is, however, spoilt by the ' foot rot ' caused sometimes by *Leptosphaeria*, sometimes by *Ophiobolus* ; in the province of Rome *Puccinia glumarum* has been particularly widely spread, specially on the early ' Mentana ' wheat, though serious infection with *P. graminis* has not yet been observed ; the first report of *P. triticina* was on hard ' Senatore Cappelli ' wheat on 15 April, which is considerably later than in past years.

Canker of apple and pear trees due to *Nectria ditissima* has been somewhat frequent in Piedmont this year.

Vegetables belonging to the family of the Compositae, and lettuce in particular, have in various parts of Italy been attacked by *Bremia Lactucae*, without however there being serious loss of the produce.

(1) Communication from the Royal Station of Plant Pathology, Rome, official correspondent of the Institute.

Until April infection with *Ascochyta Pisi* and *Peronospora Viciae* was observed on peas, the former being particularly serious as it threatened the pods.

Cultivated roses under glass and in the open have suffered much from *Botrytis* which attacked the flower buds and to an even greater extent the leaves, making the plants of little commercial value.

Napicladium Tremulae (*Didymosphaeria populina*) on Canadian poplars in Piedmont, though less severe than last year, is always present to some extent.

Young chestnut plantations were found to be affected with *Phytophthora cambivora* in the following communes of the province of Cuneo. — Monastero Vasco, Frabosa Sottana (divisions Alma, Riosecco, Griseri dell'Alma and Pianvignale), Montalto di Mondovì (regions Oberti and Costande) and Monasterolo Cirsotto.

In certain places the wet season has favoured infection with various species of Erysiphaceae, without however causing appreciable losses.

Bacteria. — Some particularly noteworthy bacterial affections of tobacco, caused by *Pseudomonas pseudozoogleae*, and of potatoes, caused by *Bacterium Solanacearum*, were observed in the districts of Lecco and Udine.

In various localities near Cervignano bacterial mulberry blight (*Bacterium Mori*) continues to appear. A rot of gladiolus bulbs set up by *Bacterium marginatum* has caused some damage in gardens near Rome.

Insects. — In the neighbourhood of Rome this spring *Thaumetopoea pityocampa* was observed even in localities where few ornamental pines are grown; active control measures immediately undertaken will undoubtedly in future years restrict the damage to those pines already affected and will check further spread.

Wheat has been seriously damaged by Thripidae in various parts of Italy (Sardinia, Sicily, Rome, Veneto, etc.); the ears were much spoilt by the abortion of numerous spikelets, often whole ears being reduced to only the axis.

Many plants were injured by Aphididae, to perhaps a greater extent than in past years. Amongst the species most affected were roses, plums, peaches, wheat, etc.

In Piedmont the presence of the larvae of a Curculionid (*Larinus*) was reported on the inflorescence stalks of artichokes; often when the insects were in great numbers the stalk was broken through.

In the province of Rome this year there was a considerable invasion of Moroccan locusts (*Dociostaurus maroccanus*) coming from eggs deposited last year. The zones most affected up to the present are the communes of Anzio, Nettuno, Cisterna, the Agro Romano included in these communes, the part of Sezze in the plain and the commune Terracina. In the greater part of the region the damage was confined to the natural pasture; in other places (Anzio, Agro Romano) the locusts have invaded or menaced crops of wheat, other cereals and lucerne. Control was carried out according to Government regulations by catching the insects with tents and poisoning the zones with solutions of sodium arsenite; certain owners of pastureland prefer using naphtha.

Mites. — A parasitic mite, *Epitrimerus piri* Nal., not previously recorded has recently been found in nurseries and orchards in the province of Ravenna; it damages the young shoots of pear trees.

Non-parasitic diseases. — Many cases of 'ginocchiatura' have been again this spring reported on early 'Mentana' wheat in various districts. The affection appears less frequent than in the past year, but perhaps owing to the increased attention paid to it seems more widely distributed.

Another affection of wheat, perhaps due to weather conditions, is a variegation of the leaves with longitudinal white stripes of varying width. This variega-

tion is apparent mostly on hybrids such as the early ' Mentana ' and ' Edda , wheats and to a less extent on ' Ardito ' and ' Balilla '. It has been particularly noticeable this year in the provinces of Piacenza, Parma and Pavia.

The fall of fruit buds of the peach (var. ' Mayflower ' and ' Amsden ') has continued to occur, specially in the vicinity of Rome. A study of this disease is in progress ; it seems, however, that the agency of parasites must be excluded and that the trouble is due rather to particular conditions of soil, cultivation and weather

A suberisation of potato tubers, probably caused by the weather, has been noted. A browning of the centre of the potato, which has been observed with some frequency near Rome and in Apulia, has been regarded as due to virus disease which often causes necrosis and consequent browning of tissues. Experiments have been initiated to test this hypothesis.

Nigeria: Locust Invasion (1).

As mentioned in my previous communication (see this Bulletin, 1930, pp. 85-86) swarms of *Locusta migratoria migratorioides*, R. & F., occurred in various parts of Nigeria between early December, 1929, and the end of February, 1930. Information from various native sources has established the fact that a similar large scale invasion took place about 35 years ago.

The first hopper band was found near Iseyin in the Oyo Province on March 31st, 1930, and during April and the first half of May there was a heavy infestation of hoppers in both the Oyo and Abeokuta Provinces (south-west Nigeria). In April hopper bands were very numerous in the Benue Province and by the end of May had been reported from all of the remaining ten Provinces in the North, although they were then infrequent in the three most northerly Provinces, viz. Sokoto, Kano and Bornu. The first report of hoppers becoming adult was received from the Abeokuta Province on May 3rd. During May and June most of the daughter swarms which had survived the anti-hopper campaign flew in a north-easterly direction ; from the last week of May to mid-July many swarms entered the Sokoto Province from the west and proceeded in an easterly direction. Many of the daughter swarms bred in the vicinity of Lake Chad and Mr. O. B. Lean, Entomologist, organised a poisoned bait campaign on the Nigerian shores from mid-August to mid-October in the course of which some 7,300 acres of hoppers were destroyed. During September, October and November hoppers appeared in nearly all of the Northern Provinces and it is evident that very many of the daughter swarms did not participate in the general concentration of swarms in the Chad area. In late September and October Mr. Lean observed many swarms of the new generation (third) entering the Bornu Province from the east, and with the onset of the north-east wind in the latter month swarms commenced to fly to the south-west. By the end of November they had reached the south of the Abeokuta Province in the west and Calabar in the east. From December, 1930, to March, 1931, sexually immature swarms of the third generation have been principally concentrated in the Southern Provinces, Ilorin and Benue.

During the 1930 anti-hopper campaign most of the usual control methods were utilised, viz. trenching, barriers, spraying and poisoned bait. During the coming campaign which is expected to commence very soon, the poisoned bait method

(1) Communication from the official correspondent of the Institute, Mr. F. D. Golding, M. A., F.E.S., Senior Entomologist, Agricultural Department, Ibadan, Nigeria.

is to be the principal measure for combatting hopper bands, and arrangements have been made for the establishment of bait factories at suitable places throughout Nigeria. The organisation of the campaign in the Northern and Southern Provinces is in the hands of the respective Assistant Directors of Agriculture. The bait to be used consists of bran, chaff or sawdust steeped in a solution of sodium arsenite in water, the proportions being approximately 12 oz. of poison, 8 gallons of water and 30 lbs. of base.

In February a mission proceeded to Dahomey and Colonie du Niger in order to discuss anti-locust measures with the French authorities in those two colonies. During the Chad campaign (mentioned above) a French official visited the scene of operations to confer with Mr. Lean.

Yugoslavia: Crop Pests (1).

During the last year and the early part of this a diminution has been noted in the damage to plum orchards caused by *Eulecanium corni* Bouché. The dry and mild spring of 1930 was very unfavourable for the development of the larvae after hibernation. The invasion of scale insects has during five years assumed catastrophic proportions ; ten million trees of *Prunus domestica* have been killed. At the present time the intensity of the invasion has been reduced by $^4/_5$, with a corresponding reduction in the damage.

In the eastern districts this spring *Loxostege sticticalis* L. has caused injury to lucerne, beet and maize ; the losses amount to 2,500,000 ' dinars '.

In the same districts *Cricetus cricetus* L. and *Citellus citellus* L. have caused serious loss.

The fine spruce forests in Bosnia have for three years been attacked by *Scolytidae*. The Government has voted a sum of 10 million ' dinars ' for the organisation of the control of the beetles. In all the pine forested regions *Lophyrus rufus* Rtzb. has made its appearance in menacing numbers.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany (Saxony) (2). — An Order of 12 March 1931 — 36 VII — from the Ministry of National Economy instructs the rural and urban Communes to take such measures as are necessary to control the diseases and pests of fruit trees. They will be supplied free of charge with the necessary explanatory leaflets on request.

The Order also provides for the control of diseases and pests of asparagus. To ensure a general and uniform control of *Puccinia Asparagi, Platyparaea poeciloptera,*

(1) Communication from the official correspondent of the Institute, Dr. Michaëlo Gradoyevitch, Maître de Conférences à la Faculté d'Agronomie et de Sylviculture, Belgrade.

(2) Communication from the Biologische Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, official correspondent to the Institute.

Crioceris asparagi and *C. 12-punctata* it is required that all asparagus stems must be cut and burnt in the field before the end of October every year ; any remaining must be pulled up and burnt during the winter (before the end of February) ; in the harvesting of seed attention must be paid to the productivity and resistance to diseases and pests of the mother plants ; the resistance of the plants must be strengthened by applying suitable complete fertilisers, by careful tillage and well-spaced planting (200 × 50 cm) and by correcting soil reaction.

Pucc. Asparagi should be controlled by planting only varieties recognised as rust-resistant in the locality. Bordeaux mixture sprays may also be applied.

It is recommended for the control of *Platyparaea* to cut back to the crown any shoots which are twisted or unhealthy in colour and, since the pest prefers sunny places, to shade the plants.

Young *Crioceris* may be removed by rubbing the plants lightly wih the hand from time to time. The beetles or larvae may also be shaken into bowls containing a little petrol. The best method however consists in applying arsenical sprays. The beetles may be caught in winter when they seek shelter by means of corrugated paper bands such as are used to protect fruit trees.

Spain. — With a view to making uniform the official certificates issued by the Phytopathological Service at the ports and frontier stations, the Minister of National Economy has by the ' orden ' of 21 May 1931 provided that — except in cases where special models are required by certain countries and accepted by Spain — such certificates shall conform to the model annexed to the present ' orden '. [This model itself conforms to that scheduled by the International Convention for Plant Protection, Rome, 16 April 1929. Cf. this *Bulletin*, 1929, p. 55]. (*Gaceta de Madrid*, Madrid, 3 junio 1931, año CCLXX, tomo II, núm. 154, págs. 1166 y 1167).

France. — A Ministerial Decree of 15 April 1931 indicates the distribution among the twenty-seven phytopathological circumscriptions of the country, of the horticultural and viticultural firms and the exporters of agricultural produce of plant origin which are inscribed for 1931 on the control lists of the Service of Plant Protection and Phytopathological Inspection, and specifies the inspectors, agents,assistants and controllers of the said Service for 1931. (*Journal Officiel de la République Française*, Paris, 22 mai 1931, LXIII[e] année, nº 119, p. 5641-5644).

Mexico (1). — With a view to preventing the introduction of the two wheat diseases known in the United States of America under the names of ' flag smut ' (*Urocystis Tritici* Koern.) and ' take all ' (*Ophiobolus graminis* Sacc.) as well as of other serious diseases, not yet known in the Republic, changes have been introduced by a Presidential Decree dated 4 March 1931 in the ' Cuarantena Exterior número 8 ' (cf. this *Bulletin*, 1929, No. 3, pp. 39-40 and No. 4, p. 57) as follows :—

(*a*) A ' Cuarentena Exterior absoluta ' is proclaimed whereby is prohibited the importation of all species and varieties of wheat ;

(*b*) The importation of wheat may be allowed by special permit when required for study purposes or scientific research, provided that such precautions are observ-

(1) Communication from the official correspondent of the Institute, Dr. Alfonso Dampf, Jefe del Departamento de Investigación de Plagas, Oficina Federal para la Defensa Agrícola, San Jacinto, D. F.

ed as are required by the ' Secretaría de Agricultura y Fomento ' through the ' Oficina Federal para la Defensa Agrícola '.

The present ' Cuarentena ' will be applied on and from 6 March 1931.

*** For the purpose of preventing the introduction of the European corn borer (' barrenador europeo del maíz ', *Pyrausta nubilalis* Hb.) a Presidential Decree was issued on 25 March 1931 applying the ' Cuarantena Exterior número 11 ' to come into force on the 28th March whereby the importation is absolutely prohibted of : —

(*a*) Maize in the grain or in the cob and of any other part of the plant (stalks, leaves, etc.) ;

(*b*) Broom corn (any part of the plant) ;

(*c*) Any variety of sorghum (any part of the plant) ;

(*d*) ' Zacate del Sudán ' [Sudan grass] (any part of the plant) ;

(*e*) Celery and rhubarb, dry or fresh, and beet with tops ;

(*f*) Cut flowers or whole plants of *Chrysanthemum*, *Aster*, *Cosmos*, *Zinnia*, *Malva*, *Hydrangea Hortensia* and cut flowers or whole plants of *Gladiolus* and *Dahlia*, except bulbs and roots of the last named plants without stems;

(*g*) Straw of all cereals and Graminaceae whether as such or used for packing.

The importation of the above mentioned plants and agricultural produce may be allowed by special permit for study and scientific work provided that such precautions are observed as are required by the ' Secretaría ' through the ' Oficina '.

Any breach of the present regulations will be punishable by a fine of 10 to 1000 ' pesos ' payable by the consignor, as well as by any one conveying the goods, which will be destroyed without compensation.

If a really effective process for the sterilisation and fumigation of plants and of the above named agricultural products be discovered, the ' Secretaría ' may apply the ' Cuarentena parcial ' in lieu of the ' Cuarentena absoluta '.

Special instructions are appended to the said Decree, bearing the date of the 7th April 1931, which shall be observed by the inspectors of the ' Oficina ' in connection with the use of straw, of any cereal and Graminaceous plant for the packing of commercial products. Inspectors may permit the entry of goods packed with straw and shipped to Mexico before the enforcement of the ' Cuarentena Exterior número 8 '.

During the present year importers may in any Mexican port or frontier post exchange the straw used for packing (which will be burned) for another product or material which can replace it, or submit the goods to fumigation with carbon bisulphide, hydrocyanic gas, etc. in accordance with the present regulations and taking all necessary precautions when treating foodstuffs not packed in metallic or glass vessels.

The quantities of carbon bisulphide or of hydrocyanic gas to be used for fumigation purposes are fixed, as is the duration of the treatment. Any expenses incurred shall be borne by the importer.

The following are the ports and frontier posts by which importation may be allowed : —

On the northern frontier: Zaragoza, B. C. ; Mexicali, B. C. ; Nogales, Son. ; Agua Prieta, Son. ; Juarez, Chih. ; Piedras Negras, Coah. ; Villa Acuña, Coah. ; Nuevo Laredo, Tamps. ;

On the coast of the Gulf of Mexico : Tampico, Tamps., ; Veracruz, Ver. ; C. Alvaro Obregón, Tab. ; Progreso, Yuc. ; Payo Obispo, Q. R. ;

On the southern frontier : Suchiate, Chis. ;

On the Pacific coast : Ensenada, B. C. ; Mazatlán, Sin. ; Manzanillo, Col. ; Acapulco, Gro. ;

All other ports and frontier posts which the ' Secretaría' may consider it necessary to authorise.

The ' Secretaria ' will in good time make known the regulations, which shall apply on and from the 1 January 1932.

Réunion (Island of). - - By Governatorial Decree No. 15, dated 6 January 1931, authorisation for the importation, circulation, storage and transit of plants, sets and seeds of sugar cane may be allowed, subject to the conditions specified in Art. 2, paragraph 4 of the Ministerial Decree of 3 December 1929 (see this *Bulletin*, 1930, pp. 89-90), only by the port of Pointe des Galets. (*Révue Agricole de l'Ile de la Réunion*, Saint-Denis-Réunion, 1931,2ème sér., XIXe année, nº 1, p. 25-26).

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Introduction (pp. 5-7).

Part. I. The physical factors of insect life.— I. Heat (pp. 7-68). II. Humidity (pp. 68-74). III. Other climatic factors (pp. 74-80). IV. Combinations of several factors (pp. 80-86).

Part. II. Weather, climate, and insects. — V. Relations of weather to the activities of insects (pp. 87-99). VI. Daily and annual cycles (pp. 99-115). VII. Climate and distribution (pp. 116-136). VIII. Effect of climate on abundance (pp. 136-162). IX. Climate and weather in economic entomology (pp. 162-186). Bibliography (pp. 187-232). Index to authors (pp. 233-238). Subject index (pp. 239-247)].

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NOTES

International Competition for a Method of Controlling the Root Rot of Citrus Plants. — The last date for entering this competition organised by the ' Camera Agrumaria ' of Messina, Italy (cf. this *Bulletin*, 1930, p. 96), has been postponed to 31 March 1932.

Prof. ALESSANDRO BRIZI, *Segretario generale dell'Istituto, Direttore responsabile.*

DISCOVERIES AND CURRENT EVENTS *

Algeria : Desert and Moroccan Locusts (1).

Although last year Algeria was the scene of a formidable invasion of desert locusts (*Schistocerca gregaria* Forsk.) in 1931 they have been reported only in certain communes in the vicinity of Tlemcen. They made their appearance at the beginning of March in the mixed commune of Marnia. Egg laying took place first at Kef (Mixed commune of Marnia) and in the douar of Tameksalet over about 10 sq. kilometres. The flight then followed down the Tafna and eggs were laid successively round Hammam-Bougrara (Marnia and Remchi), at Oulad Riah (Remchi) between the Ain Berdil and the Aïn Romana (right bank of the Tafna), at Beni-Mishel (Nédroma), on both banks of the Tafna and finally in the plain of Remchi and from there to the sea.

Control measures were carried out in optimum conditions and gave excellent results everywhere ; the damage was confined to certain hectares of young vines, the leaves of which were eaten.

The interesting conclusion may be drawn that poisoned bait allows of an effective control of winged locusts and not only of hoppers. This method, which had already been experimented with successfully in 1930 at Nédroma and Turenne, gave complete satisfaction this year at Beni-Saf. If used immediately on the arrival of the locusts it should make it possible in future to reduce considerably the size of the locust swarms which by successive stages will gradually gain the cultivated districts of the uplands of the Tell.

***

As a result of the efforts expended for nearly four years the areas invaded by Moroccan locusts (*Dociostaurus maroccanus* Thnb.) in Algeria have progressively and rapidly decreased. During the spring of 1931 control measures were confined to the south of the department of Algiers (Mixed Commune of Aïn-Boucif) and to the north of the Annexe of Djelfa (Tribes of the Oulad ben Abdallah and the Oulad Abdel Kader). Some small centres occurred also in the mixed Commune of Saïda.

At Aïn-Boucif the records of laying showed the existence of a contaminated area of 100 ha. distributed among various small patches in the douars of Zenzach and Guelt es Stel. In the Annexe of Djelfa about 300 ha. were registered.

* In this, as in the two next chapters, the countries are arranged in French alphabetical order.

(1) Communication from the official correspondent of the Institute, Mr. DELASSUS, Crop Protection Inspector to the General Government of Algeria, Algiers.

Hatching began in these two regions at the beginning of April and continued until the 20th.

Control was actively carried out from the first with a quantity of native labour by means of burning alfa and poisoned bran. The result was absolutely complete destruction and on 25 May the gangs were disbanded, all the locusts having been destroyed.

Egypt: Occurrence and Movements of Desert Locusts *(Schistocerca gregaria)* (1).

The sexually mature locusts which entered Sinai late in April 1931 and reached the South Western part of the Peninsula together with others coming from the East on May 12, remained roaming about in S. Sinai for a short time when they crossed the Gulf of Suez and appeared at Hurgada and other posts on the Red Sea coast.

Shortly afterwards they were flying to the S. West and were reported from Kena and Assuan.

In two cases they reached the cultivation in these Provinces.

No egglaying has so far taken place. The present conditions availing in the desert are not quite favourable for breeding, the valleys being dry with only scanty vegetation.

At about the end of the month, May 26, red invaders penetrated into Sinai via Ras el Nagb and Kuntilla, two paths North of Adaba usually followed by locusts. One swarm about 4 kilometres long continued its flight to the S. W., crossed the Sea and settled at W. Belihn N. W. of Hurgada, where it is now combatted. Later on others came direct from the East, most probably from Arabia, and reached the Eastern Desert between Mosseir and Hurgada.

On the 31st the vanguards of these swarms appeared on the borders of Kena and Assuan.

The scouting of different desert regions has been going on all the time. This work has been accomplished in S. Sinai. The mature locusts left no trace except the eaten leaves of the orchards round the monastery.

One fighting party has been stationed at Hurgada, another is on the way to this spot.

Flame guns and kerosine have been dumped in Sinai as well as in the agricultural centres at Kena and Assuan to combat any locusts that might appear.

Eritrea: Desert Locusts *(Schistocerca gregaria)* (2).

In April 1931 large swarms of locusts flew towards the territory of the Colony from beyond the Abyssinian frontier.

On 6 April numerous locusts coming from Safò (Tigrai), after crossing the Mareb flew in the direction of the Seraè and alighted in the territories of Chenafenà Ghersunila, Haleuat, Merad Lam and Addis Addi ; on the 7th they took flight again towards Ganà (Hazamò) from where they flew in an easterly direction.

In the first decade of April new centres of hoppers were continually being re-

(1) Communication from the Chief Plant Pathologist, Plant Protection Section, Ministry of Agriculture, Cairo, Egypt, to the International Institute of Agriculture.

(2) Communication from the official correspondent of the Institute, Dr. A. De Benedictis, Chief of the ' R. Ufficio Agrario ' of Eritrea, transmitted by the Government of the Colony.

ported in the Agambussa: in the localities of Macalà, Mercà, Maaggarò, Gumredagà and in the territory of Mensa Bet Sciacan. On the 9th a swarm coming from Liban passed over Scicchetti flying first in a northerly and then in a southerly direction.

On 13 April a small group of red locusts coming from the eastern plain was observed at Mai Ela, Adi Comté, Metaten, Addis Addi and Halai ; a swarm coming from Zula was also reported flying towards the Agametta. Yellow locusts coming always from the eastern plain came to ground on the 20th on the high plateau of Cohaitò.

From the movements recorded during April it is apparent that the summer cycle of invasions of the Colony is started by locusts coming from Abyssinia. These numerous swarms which invade the high plateau are a continual source of danger in spite of a careful watch being kept and many of them being destroyed. The swarms coming from the eastern plain may be regarded as negligible in comparison.

United States of America: Outstanding Entomological Features (1).

The following notes refer to May, 1931.

Probably the most serious insect development of the month is the severe armyworm (*Chorizagrotis auxiliaris* Grote) outbreak occurring over 11 counties in north central Texas. A similar outbreak is under way in Mississippi and Kentucky with lesser outbreaks in eastern Arkansas and the eastern shore of Virginia.

Cutworms seem to be unusually prevalent along the Atlantic Seaboard. These insects are also very troublesome this spring in the East Central States, and westward to Montana, the Dakotas, and Nebraska. The remainder of the country is experiencing about the normal cutworm damage.

During the first week in May grasshoppers' eggs were found to be very numerous in South Dakota and at that time began hatching in Montana and Nebraska. By the third week in the month, hatching was reported from the Great Basin. The Salt River Valley of Arizona and the Antelope Valley and the Klamath Lake district of California are having localized grasshopper outbreaks.

Owing to the cool weather of late spring considerable wireworm injury was reported from scattered localities throughout the United States.

As a whole, the Hessian fly (*Phytophaga destructor* Say) situation does not seem to be alarming, although Illinois reports that from 32 to 40 per cent. of the tillers are infested in certain fields.

The chinch bug (*Blissus leucopterus* Say) situation in Illinois, Missouri and parts of Kansas appears to be rather serious. Large numbers of the bugs are in the fields, and in some cases in Illinois are killing wheat, while in Kansas reports of the killing of a lot of oats by this insect have been received.

The corn ear worm (*Heliothis obsoleta* Fab.) is commencing to appear in destructive numbers in the Gulf States.

A very unusual and severe attack of one of the tiger moths (*Apantesis phalerata* Harr.) is reported from south-central Tennessee. The Lincoln County agent estimates that in that county alone 500 acres of corn are destroyed, and many pastures are completely stripped of vegetation.

(1) Communication from the official correspondent, Mr. J. A. Hyslop, Senior Entomologist in charge, Insect Pest Survey, transmitted by Mr. C. L. Marlatt, Chief, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

The alfalfa weevil (*Phytonomus posticus* Gyll.) is so abundant in western Nevada as to necessitate control measures.

During the latter half of the month adult codling moth (*Carpocapsa pomonella* L.) were emerging in the Middle Atlantic States. In the southern part of this section the emergence is considerably later than last year. In the Eastern Central States winter survival seems to be somewhat higher than last year, emergence in this section occurring at about the same time as last year. In the Pacific Northwest emergence occurred during the first week of May, while in California the peak of emergence in the Antelope Valley was on April 10.

The fruit aphid situation has not materially changed since last month. The rosy aphid and apple grain aphid increased slightly in abundance toward the end of the month.

Apple leafhoppers continue to be unusually numerous in New England, and are doing serious damage in the Hudson River Valley in New York State.

A rather unusual outbreak of the striped cucumber beetle (*Diabrotica vittata* Fab.) as an apple pest has developed in Mississippi. This was first observed last year when this insect, by feeding on the blossoms, ruined a large part of the crop in the northeastern part of the State. This year the insect has again attacked the blossoms but not so seriously as last year.

The European red mite (*Paratetranychus pilosus* Can.) started hatching during the first week in May in New England and the Middle Atlantic States. Abundance does not seem to be unusual.

The oriental fruit moth (*Laspeyresia molesta* Busck) on a whole does not seem to be unusually abundant in its range this season.

The plum curculio (*Conotrachelus nenuphar* Host.) is not abnormally abundant throughout the New England, Middle Atlantic, and South Atlantic sections. On the whole emergence is later than usual, and in Georgia the infestation is the lightest in the past 13 years.

The grape leafhopper (*Erythroneura comes* Say) is reported as unusually abundant in southern New Jersey and in eastern Virginia.

Heavy infestation of pecan by the hickory phylloxera (*Phylloxera caryaecaulis* Fitch) was reported from the Gulf section and this insect was doing serious damage to trees in Louisiana.

The pecan case bearer (*Mineola indiginella negulella* Riley) was very injurious during the first half of the month in Mississippi and Texas.

The infestation of the six-spotted mite (*Tetranychus sexmaculatus* Riley) in Florida is rapidly decreasing, apparently owing to a fungus disease.

By the middle of the month the striped cucumber beetle (*Diabrotica vittata* Fab.) put in its appearance in the southern part of the Middle Atlantic States, and was recorded as quite generally abundant and destructive throughout the eastern part of the United States, westward to Nebraska, Oklahoma, and Mississippi.

The first adult of the spotted cucumber beetle (*Diabrotica duodecimpunctata* Fab.) was observed in Maryland on April 5, and in Kansas on May 19.

Flea beetles on truck crops occasioned considerable injury in New York and New Jersey.

During the cool weather of May the seed corn maggot (*Hylemyia cilicrura* Rond.) did considerable damage to bean and cucumber seed in Virginia, to corn and beans in Illinois, and to similar crops in Kentucky, Missouri, parts of Kansas, and Utah.

The potato tuber worm (*Phthorimaea operculella* Zell.) has been unusually abun-

dant in parts of Los Angeles County, Calif., this year, and was reported from stored potatoes at Newark, Del.

By the middle of the month reports of serious infestation by the cabbage aphid (*Brevicoryne brassicae* L.) were received from New Jersey, Virginia, Ohio, and Indiana. In some cases the infestations are suspected as having originated on plants shipped from the South. Very heavy infestations of cabbage by the cabbage aphid were also reported from Mississippi.

Rather heavy infestations of the harlequin bug (*Murgantia histrionica* Hahn) were reported from the southern tip of New Jersey during the month. In the Norfolk district of Virginia eggs of this insect were numerous in the field during the last week in April, and the first nymphs were observed on May 12.

The State Plant Board of Mississippi reports that the strawberry weevil (*Anthonomus signatus* Say) was found seriously infesting strawberries in the southeastern part of the State. This is the first record of this insect in Mississippi.

During the last week in May the Mexican bean beetle (*Epilachna corrupta* Muls) appeared in the fields in the southern part of New Jersey, and on the eastern shore of Maryland. During the first week in the month the insect was observed in the Norfolk district of Virginia. This insect is causing considerable damage at the present time in North Carolina and has extended its range southward to Albany, Ga. Except for the isolated infestation at Thomasville, Ga., this is 37 miles south of where it was recorded last year.

Canker worms are reported as somewhat more abundant than usual in the New England States. Similar reports have been received from Minnesota and Kansas.

One of the worst outbreaks of the forest tent caterpillar (*Malacosoma disstria* Hbn.) ever recorded is under way in central Virginia. Complete defoliation of forest trees has been observed over considerable areas.

The larch case bearer (*Coleophora laricella* Hbn.) is heavily infesting the larch of New Hampshire, Vermont, and parts of Pennsylvania. Heavy stands appear as if scorched by fire owing to the feeding of this insect.

The European pine shoot moth (*Rhyacionia buoliana* Schiff.) is becoming generally prevalent in southern New England, southern New York, New Jersey, and Pennsylvania. So far the infestations are all confined to nurseries, and transplanted trees. The Nantucket pine shoot moth (*Rhyacionia frustrana* Comst.) is reported as doing serious damage to several species of pine in a nursery in the Philadelphia district of Pennsylvania.

Finland: *Bacterium maculicolum* (1).

The presence of *Bacterium maculicolum* McCulloch in Finland has been found by Dr. V. Krohn of Helsinki. He has succeeded in infecting seedlings of cauliflower and Brussels sprouts with pure cultures, but the common cabbage was not attacked. The disease would appear to be already somewhat widely distributed in southern Finland (Turku, Helsinki, Hämeenlinna, Hamina).

India: Plant Diseases in Burma (2).

There was a severe attack of mosaic disease on chillies (*Capsicum annuum*) during the last season 1930-31. The cause and the vectors of the disease are being investigated. No control measures are possible at present.

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(1) Communication from the official correspondent of the Institute, Prof. J. Ivar Liro, Director of the Plant Diseases Section of the Agricultural Experiment Station, Helsinki.

(2) Communication from the official correspondent of the Institute, Mr. U Thet Su, B. Ag., D. I. C., Mycologist, Burma, Mandalay.

The sterility of pigeon pea (*Cajanus indicus*) accompanied by a proliferation of smaller leaves occurred with a greater intensity than in the last year. The cause of the disease is not yet known.

Italian Somaliland: Desert Locusts (*Schistocerca gregaria*) (1).

2 January 1931 – Zone of Mahaddei and Villagio Duca degli Abruzzi: numerous swarms flew over the zone.

4 January 1931 Oddur: a great number of locusts flew over the zone from the north-east. Alighting on the 'sciambe' they caused considerable damage.

6 January 1931 – Residence of Baidoa: huge swarms crossed the zone destroying the crops.

8 January 1931 – Commissariat of Oddur: to the north of Uegit numerous swarms caused damage to the Guinea corn.

9 January 1931 – Commissariat of Oddur: numerous locusts crossed the zone from the east in a northerly direction.

10 January 1931 – Commissariat of Baidoa: in the zone between Baidoa and Oddur enormous damage was caused by locusts to Guinea corn.

13 January 1931 – Residence of Afgoi: numerous swarms coming from the south-west flew in an easterly directlon.

16 January 1931 – Commissariat of Villabruzzi: numerous locusts coming from the north crossed the zone following the course of the river.

29 January 1931 – Tohen: passage of a dense swarm of locusts. No damage.

18 April 1931 – Residence of Oddur: a locust swarm passed at a great height over Oddur coming from the N. E. and flying to the south.

14 May 1931 – Residence of El Bur: locust swarms from north flying south.

16 May 1931 – Territories of Beletuen: great swarms from N. W., flying S. E.

17 May 1931 – Residence of Itala: various swarms from north flew slowly southwards. The largest alighted in the zone and laid eggs.

28 May 1931 – In the territory between Oddur and Lugh Ferrandi many hatchings took place.

1 June 1931 – Residence of Lugh Ferrandi: hatching reported almost everywhere.

12 June 1931 – Residence of Oddur: numerous swarms.

The damage was on the whole of little importance. The invasions were combatted with spraying and other control methods.

Jugoslavia: Serious Sugar Beet Crop Losses (2).

The sugar beet crops in Jugoslavia have been badly damaged this year. The most seriously affected regions were Slavonia and Osijek, where the intensive cultivation of beet is widespread.

Unfavourable weather coinciding with the ravages of pests and fungi have affected nearly all the fields, in some cases to such an extent that it was necessary to re-plough.

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(1) Communication from the Ministry for the Colonies ('Ufficio Studi e Propaganda'), Rome, to the International Institute of Agriculture.

(2) Communication from Dr. Mirko Korić, Director of the Royal Agricultural Experiment Station, Osijek, to the International Institute of Agriculture.

The cold and wet spring delayed sowing until April, the normal planting season being 10 to 20 March. The young plants grew slowly on account of the continued bad weather and by reason of their retarded growth were seriously attacked by the ' Wurzelbrand ' fungi, which occur somewhat widely in the soil of this region but in normal years cause insignificant loss. Then the already stunted and sickly crops were invaded by various pests, amongst which a weevil (*Cleonus* [*Bothynoderes*]) must be mentioned, which appeared in numbers such as had never previously been seen, and certain Chrysomelids (*Psylliodes attenuata* and *Chaetocnema concinna* in particular). These occurred in such numbers that all control measures were of no avail. Poison sprays, which were applied in the strongest concentration possible (two or three times the normal strength), were unable to save the crops, because the insects always appeared again in milliards and in the end caused catastrophic damage. On all sides the beet fields showed scarcely a trace of green.

Every means of protecting and saving the crop was tried because in spite of present prices and the trade crisis the sugar beet plantations are still remunerative.

Immediately after sowing the beet fields were surrounded with trenches to check the invasion of young *Cleonus* and other non-flying insects. Then the picking of the weevils was begun. But their numbers were such that on one farm 2500 litres were collected from 150 ha. and on another 3,300 litres from 50 ha. Millions of insects were killed by the sprays, by turkeys and ducks, by burning with petrol flame-throwers and by crushing. But the preventive and control measures, of which the cost was enormous, were all without decisive result.

In Slavonia out of an acreage of 6325 ha. of beet grown for the Osijek sugar factory 1986 ha. were completely destroyed by the *Cleonus*. On one farm near Osijek out of 28.75 ha. 27.6 ha. were destroyed by the ' Wurzelbrand ' and Chrysomelids. One farm on which beet was particularly intensively grown lost 34.5 ha. out of about 172.5 ha. although 120,000 ' dinars ' were spent for the control of the *Cleonus*. Another farm spent 50,000 ' dinars ' for the protection of its 49.5 ha. of beet and yet had to replough 17.3 ha. which were completely devastated by the *Cleonus*.

These enormous losses of sugar beet caused by insect invasion are due to the whole region being very intensively cultivated but with little variation in the kind of crops grown. The two preceding winters were mild and favoured the development of the insects and were thus a danger for the following years. For this reason the Osijek factory has decided to undertake itself an active control compaign and to continue it the following year on its own account and with a uniform plan. The factory proposes to spray the beet fields immediately after germination. By this means the control instead of being left to the different growers will be under uniform and expert direction.

VARIOUS QUESTIONS

An International Enquiry on the Biological and Artificial Control Measures of Nut Grass *(Cyperus rotundus)* (1).

The spread of the weed known under the botanical name of *Cyperus rotundus* L. (Cyperaceae) ; the difficulty not merely of destroying it, but also of preventing it

(1) Communication from the official correspondent of the Institute, Dr. R. Ciferri, Director of the Estación Nacional de Agronomía y Colegio de Agricultura, Moca, República Dominicana.

from invading lands previously not infested ; the very wide area of distribution which is not precisely ascertained but extends from the warm temperate regions to the tropical regions of America, Asia and Africa ; our scanty knowledge of its natural enemies and of any antagonisms there may be between it and other cultivated or wild plants, make necessary an understanding between all engaged in studying the problem of the control of *C. rotundus*.

It would be desirable first to obtain information on the following points : -

(1) Among the countries wherein the presence of this weed has been noted, those in which the plant actually constitutes a problem for the agricultural development of the infested zones ; in other words to ascertain : (*a*) whether there are countries or zones in which *C. rotundus*, although present, does no damage direct or indirect, or where it is supposed that it does no harm nor in any way hinders agricultural development ; (*b*) the reason for this.

(2) The animal or vegetable parasites, even of small importance, which may exist in countries where *C. rotundus* is found, with all possible information as to their nature, their ascertained or presumed effectiveness, the possibility of introducing them into countries where they do not exist, etc.

(3) Antagonisms existing between *C. rotundus* and any other plant, wild or cultivated, and in consequence the possibility of using this means of control.

(4) The practices locally adopted for destroying or reducing the infestation or for preventing wholly or partially the spread of this weed in zones previously not affected, including alike practices the value of which has been determined by means of experiments and such as are only empirically employed, with some indication of their ascertained or presumed effectiveness.

(5) The possible artificial control measures, destructive or preventive, which have been tried with more or less success, or even with negative result ; their description, cost of the applications, etc.,

(6) The direct or indirect damage to crops, ascertained or presumed, resulting partially or wholly from the presence of *C. rotundus*, as well as the ascertained or presumed causes of damage which have some relation to the plant in question.

(7) A list of the Governments, scientific institutions, centres of research and individuals interested in the idea of collaboration in an enquiry into *C. rotundus*, and in the means for its control.

All proposals for the further development of this subject whether by enquiry, experiment, organisation, etc., will be welcomed and published as speedily as may be possible in this *Bulletin*.

A series of experiments, instituted in the Dominican Republic, has given the following results :—

(*a*) A higher evaporation has been ascertained of the lands seriously infested, the increase in evaporation varying from 25 to 75 per cent. as compared with lands not infested by *C. rotundus* ; such evaporation of water was ascertained by a study of the loss of water in Livingstone atmometers and radio-atmometers placed at the level of the growth of *C. rotundus* and on the adjacent non-infested soil, other conditions being equal. Although this explains the impossibility of cultivation of land seriously infested, if situated in zones of scanty precipitation (the semi-arid zones), it does not explain why in zones, where precipitations are abundant, comparative experiments on a reduced scale, using maize and beans, gave from 10 to 25 per cent. less of the product.

(*b*) The existence of animal or vegetable parasites attacking *C. rotundus* has not been verified.

(*c*) The effect of cover crops has been variable in relation to the main crop and its duration ; the best results have been obtained with the forage crop *Melinis minutiflora* Beauv., together with reptant and leafy varieties of *Ipomœa Batatas* L., among the cover crops which have a direct production value also.

(*d*) Semi-permanent coverings, with tarred cardboard, sheets of galvanised iron, etc., of the affected plots are effective but their use is too costly.

(*e*) As regards chemical substances of which trials have been made, the best results have been secured by strong applications of carbon bisulphide projected into the soil (500 g. per m²) ; this method also is very costly.

(*f*) An antagonism has been noted between *C. rotundus* and *Ricinus communis*, if the latter is grown in such a way as to shade completely a defined area ; it has been possible to ascertain by means of comparative experiment that this effect is not merely to be ascribed to the fact of shading.

(*g*) All agricultural work, and more especially ploughing and harrowing, if not carried out with suitable precautions, has a tendency to encourage the spread of *C. rotundus* over the adjacent plots, while these operations have no perceptible effect in diminishing distribution of the weed over any particular area ; in fact the effect is frequently the opposite to that desired.

(*h*) Diffusion in areas favourable to growth, even if not adjacent, takes place by means of transport of seeds of *C. rotundus* ; the seeds reaching distant points by means of water-ways of all kinds, rivers or canals and even road gutters ; accordingly irrigated lands, and those traversed by rivers, torrents, canals, etc. and lands lying near roads, are infested or liable to infestation more easily than other lands.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Cyprus. — By Declaration dated 25 February 1931, published as Notification No. 183, the areas declared infested with the 'sirividhi of cereals' (*Syringopais* [*Scythris*] *temperatella*) in the districts of Famagusta and Limassol are delimited. (*The Cyprus Gazette*, Nicosia, 27th February 1931, No. 2115, pp. 106-107).

*** By Order dated 26 February 1931, published as Notification No. 184, the treatment which lands situated within the areas declared infested with *S. temperatella* shall undergo are established and the plants specified which may be grown in such lands. (*Ibid.*, p. 107).

Cuba. — By Presidential Decree No. 560 of 24 April 1931 were approved the internal regulations of the Plant Protection Service ('Servicio de Sanidad Vegetal') under the "Secretaría de Agricultura, Comercio y Trabajo'. The regulations, which consist of 58 articles under 17 headings, came into force on 28 April 1931. (*Revista de Agricultura, Comercio y Trabajo*, Órgano Oficial, Habana, Cuba, 1931, año XIII, vol. II, núm. II, págs. 57 a 68).

Egypt. — On 18 July 1931 the Italian Royal Minister of Foreign Affairs informed the International Institute of Agriculture that the International Convention for Plant Protection (Rome, 16 April 1929) [see this *Bulletin*, 1929, pp. 50-55] has been ratified by Egypt on 30 June 1930.

Finland. – On 18 July 1931 the Italian Royal Minister of Foreign Affairs informed the International Institute of Agriculture that the International Convention for Plant Protection (Rome, 16 April 1929) [see this *Bulletin*, 1929, pp. 50-55] has been ratified by Finland on 15 July 1931.

This Convention which has already been ratified by Egypt (see above) and Italy (see this *Bulletin*, 1930, p. 172) will come into force, in conformity with Art. 23, for the three ratifying countries on 15 January 1932.

India (Burma) (1). — By notification No. 9, dated the 7th April 1931, and in exercise of powers conferred by section 5 of the Destructive Insects and Pests Act, 1914, the Government of Burma (Ministry of Forests) makes the following rules for the detention, inspection and destruction of seeds and plants in respect of which a notification has been issued under section 3 or of articles which may have been in contact or proximity thereto and for regulating the powers and duties of Officers appointed in this behalf, when such seeds, plants or articles are imported by air into Burma.

These rules may be called ' The Burma Destructive Insects and Pests Rules, 1931 '.

(1) Any person who intends to import any seeds or plants by air shall give notice of such intention to the Collector of Customs, at least 24 hours before the arrival of the air craft conveying the article, and on receipt of the information, the Collector of Customs shall arrange for the deputation of an officer of Customs to inspect the imported article.

(2) The Customs Officer shall have same powers in respect of seeds, plants or other articles, the import of which is prohibited or regulated by notification under section 3, when such seeds, plants or other articles are imported by air, as are conferred upon the officers of Customs by section 4 of the Destructive Insects and Pests Act, 1914, in respect of articles imported by sea.

(3) All seeds and plants imported by air shall be landed at such place as may be appointed by the Government of Burma, by notification and shall be made over to the Customs Officer deputed for their inspection.

(4) Any seeds the import of which by air is prohibited by notification under the Destructive Insects and Pests Act, 1914, and any plant not covered by special certificate of the nature referred to in paragraph 2A of the order published with the notification of the Government of India No. 1541-Agricultural, dated the 23rd July 1930, which is brought into British India by air as part of the cargo or stores of any air craft or as any passanger's luggage or otherwise shall be destroyed by fire under the supervision of the Customs Officer with the least possible delay and in any case within 24 hours of landing.

(5) Imported plants covered by the special certificate mentioned in paragraph 2A of the aforesaid notification of the Government of India, shall be returned by the Customs Officer to the person from whom they have been received under Rule 4 or to any other person authorized duly to receive them.

(6) No compensation shall be payable for articles destroyed under rule 5 of these rules.

(7) Any breach of these rules shall be punishable, on conviction before a Magistrate, with a fine which may extend to Rs. 1,000.

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(1) Communication from the official correspondent of the Institute, Mr. **U Thet Su**, B. Ag., D. I. C., Mycologist, Burma, Mandalay.

Italy. — By Ministerial Decree of 11 July 1931 regulations have been made for the temporary importation from abroad of varieties of potatoes for use exclusively as seed for the season 1931-1932. Cf. this *Bulletin*, 1930, No. 8, p. 125. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 16 luglio 1931, anno 72°, n. 162, pp. 3560-3562).

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NOTES

An International Address Book of Botanists. — It will be remembered that the Fifth International Botanical Congress held at Cambridge, England in 1930 passed a resolution at the final plenary meeting, whereby an International Committee was appointed to arrange for the preparation and publication of a new Address Book of the Botanists of the World. The work of the Committee has now reached an advanced stage and notice has been received at the International Institute of Agriculture that the Address Book will shortly be published for the Bentham Trustees by Messrs. Baillière, Tindall & Cox, 7 & 8 Henrietta Street, Covent Garden, London, W. C. 2.

The Book itself has been planned on lines somewhat similar to Dörfler's 'Botaniker-Adressbuch', and will contain the names of some 13,000 to 14,000 botanists and botanical institutions, etc., in all parts of the world. These will be arranged alphabetically by countries, will be printed in the majority of cases in the language of the country in Roman script and will be provided with an Index of personal entries and Geographical Indices.

It should be noted that, thanks to the assistance given to the Committee by the Bentham Trustees and the Carnegie Corporation of New York, it has been found possible to publish the work at the low price of 12/6 or 13/— post free.

Prof. ALESSANDRO BRIZI, *Segretario generale dell'Istituto, Direttore responsabile.*

DISCOVERIES AND CURRENT EVENTS *

Brazil : Principal Insect Pests of Crops (1).

In 1930 a remarkable development of *Ceratitis capitata, Anastrepha fratercula* and *Lonchaea pendula* was observed on fruit trees at the Fruit-Growing Station of Deodoro ; the requisite control measures were adopted.

Among the insect pests of sugar cane *Tomaspis liturata* has not developed as in the period from 1920 to 1924, when it caused serious alarm. The instructions of the ' Instituto Biologico de Defesa Agricola ' contained in Bulletin No. 4 of the writer provide planters with the information on the biology of the parasite necessary to control it successfully. *Diatraea saccharalis* infests old plantations ; with the replanting of these the insect disappears. *Pseudococcus bromeliae, Ps. calceolariae, Ps. boninsis* and *Ps. citri,* which occur on the base of the leaf sheath, were eliminated by means of cleaning the canes intended for sugar extraction, and in the case of canes for propagation purposes by means of disinfection with carbon bisulphide.

Icerya purchasi was more numerous in 1930 than in the preceding year ; at Nova Iguassú and Rio de Janeiro some colonies of *Novius cardinalis* were liberated, which were received from the ' Secretaria de Agricultura ' of São Paulo. In 1930 the Crop Protection Inspector, Paulo Werner, obtained at Rio de Janeiro some stems of chrysanthemum infested with *I. purchasi* and bearing also numerous specimens of the predator, which after a few days in the insectarium of the Entomological Service had eliminated all the scale insects.

Aspidiotus perniciosus remains confined to one part of the State of Rio Grande do Sul, in the municipality of Rio Negro. In the State of Paraná there would have been a revival in the local breeding ground of the pest but active control measures were adopted in time.

Eriosoma lanigerum, one of the most injurious of the aphides, did not assume serious proportions, which was undoubtedly due to the action of its parasite, *Aphelinus mali,* now widely distributed.

Margarodes brasiliensis infests the roots of vines in the State of Rio Grande do Sul ; if the systematic disinfection of the soil with carbon bisulphide is persisted in the pest will not develop seriously.

Peritymbia vastatrix is confined to a small vine-growing zone in the State of Rio

* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Communication from the official correspondent of the Institute, Dr. Carlos MOREIRA, Director of the Instituto Biologico de Defesa Agricola, Rio de Janeiro.

Grande do Sul ; forbidding the export from the zone of stems and other parts of the plant has contributed to the limitation of infection.

Schistocerca paranensis, which has caused great losses in the plantations of Argentina and Uruguay, has not invaded frequently the State of Rio Grande do Sul.

Platyedra gossypiella, which did much damage to the cotton plantations on its appearance in Brazil, is now causing little loss. The control of *Gasterocercodes gossypii* is being actively conducted by the ' Serviço de Algodão '.

Costa Rica : The ' Enfermedad del Café ' (1).

A pathological phenomenon has recently been observed in the coffee plantations of Costa Rica which has caused serious alarm among the growers and all who realise the harm which may be caused to the economy of the Republic by a reduction in the crop of the principal export product.

The ' Centro Nacional de Agricultura ' has already determined with certainty the causes of the phenomenon and is able to state that it results from a serious attack, principally of young plants, by three different insects : — *Saissetia hemisphaerica*, *Pseudococcus* sp. and an Aphis.

The first two insects do damage mainly in the dry season by sucking the juices of the plant and killing the tissues, which appear charred. The insects multiply rapidly in the dry season and disappear almost completely at the beginning of the rains. It is not possible to observe the cause and effect together on one and the same plant because the insect feeds at the expense of the living tissues and as soon as they begin to wither passes on to another healthy plant. The two insects cause the partial or total death of the new shoots which results in the defoliation of the part attacked. The withering of the tissues ceases as soon as the cause is removed.

The Aphis attacks principally both surfaces of the tender leaves and terminal bud causing, just as the other two insects, the death of the plant and the charring of the tissues.

The Aphis cannot be found on the dead parts because, as with the other insects, it requires for its sustenance the juices of living tissue. In this case also the withering of the tissues ceases with the action of the insect.

The Aphis is more resistant to wet and so can continue its damage during the rainy season. For this reason the aphis injury is the only one of importance to the coffee plantations and whose symptoms correspond to those commonly called ' enfermedad del café '.

The fully grown plantations which show most the effects of Aphis attack are those which as a result of the cultivation methods used, the type of shade, the position or the quality of the soil or subsoil are completely defoliated during the dry season. The formation of new leaves is made impossible by the Aphis which attacks them as soon as they appear. The effects of the aphis are in inverse ratio with the degree of foliation of the plant.

The reduced crop from the most seriously damaged plantations does not depend so much on the action of the insects as on the loss of foliage resulting from drought.

If the plant is badly injured at the same time by both drought and the insects it loses its leaves completely and not being able to sustain its own tissues as well

(1) Communication from the official correspondent of the Institute, Mr. Bernardo R. Yglesias, Director of the Centro Nacional de Agricultura, San Pedro Montes de Oca (Republic of Costa Rica).

as the insects from lack of the organic matter formed only in the leaves and green stems, it cannot renew its growth and dies. Withering from lack of nutrition begins in the roots because this is the part of the plant furthest removed from the leaves. Only after death has set in in the leaf tissues does the action of bacteria and saprophytic fungi begin, for these do not cause decomposition.

The ' Centro Nacional de Agricultura ' makes the following recommendations to coffee planters who have had their plantations injured :—

(1) where branches and young shoots have been killed during the dry season by *Saissetia* and *Pseudococcus* it is necessary to cut back to just above the first healthy bud in order to renew the upper part of the plant with new shoots ;

(2) if the shoot still has one or two healthy internodes the shoot must be cut back so that a secondary branch will take the place of the first ;

(3) if the plant has been completely defoliated it can recover only very slowly by the production of new suckers. The reaction of the plant in this condition will never be more than mediocre so that it is better to remove it and substitute a healthy and vigorous plant ;

(4) where the young leaves and terminal bud are attacked by Aphis the latter can be destroyed by the application of contact insecticides. The most effective insecticide against aphis is a compound of sulphate of nicotine called commercially ' Black Leaf 40 ', but this preparation is not at present obtainable in Costa Rica. Recourse must therefore be taken to an emulsion of rosin spirit which can easily be prepared from ingredients which are found abundantly in the country.

The emulsion is prepared by dissolving ½ lb. of whale oil soap or 1 lb. of yellow soap in 4 litres of boiling water. To this are added 8 litres of rosin spirit and the mixture is emulsified by passing it twice through the syringe or until the liquid appears milky and has no free rosin spirit on the surface. This emulsion may be diluted in 12 parts of water when the insecticide will contain about 4.5 % of rosin spirit. To make the emulsion combine well with the water it must be stirred vigorously. It must be borne in mind that if the rosin spirit is not completely emulsified it may injure the young parts of the plant.

For the insecticide to produce the desired effect it is essential that the insects should be properly wetted, otherwise no force will be of avail. The spraying of plants on which the insects have not been observed is also useless.

The efficacy of the insecticide depends also on the form in which it is applied. The best results are obtained with a very fine spray such as is obtained with the sprayers specially designed for the purpose. For large plantations it is necessary to have large motor-worked spraying machines which make it possible to do the work adequately and economically. When only a small number of plants is injured good results may be obtained by hand spraying.

If the Aphides are located on the under surface of the leaves spraying must be done from below to ensure their being reached by the insecticide.

Cirenaica : Insect Pests (1).

Dociostaurus maroccanus Thnb. — A campaign against swarms of hoppers of Moroccan locust was carried on in the neighbourhood of El Abiar in the region of Barce from March 16-27 and from March 28 throughout April.

(1) Communication from the official correspondent of the Institute, Mr. G. Krüger, Director of the Entomological Laboratory of the ' R. Ufficio per i Servizi Agrari ' of Cirenaica, Bengasi.

Each swarm was sprayed during the moulting stage with a mixture of ' Urania ', sodium arsenite and common salt, and the result was deadly, almost instantaneous, in every case.

The abundant herbaceous vegetation of the uplands of Cirenaica make the use of poisoned bran impossible, although the arsenical mixtures at 0.8-1 % applied during the moult left nothing to be desired.

In Cirenaica *D. maroccanus* is a remnant and, considering an invasion of the region impossible with the present geographical distribution of the species, the Government has made provision for the complete destruction of the pest by forming a vast network of deposits of poison and implements.

The Government has also issued strict regulations for the reporting of breeding grounds of the Moroccan locust, also of breeding centres and alighted swarms of the Desert Locust (*Schistocerca gregaria*) in oases in the sandy and marshy regions.

Megachile sericans Fourc. (*Apidae, Gastrilegidae*). — After the control carried out in 1929 in the vicinity of the Experiment Station of La Zorda (Barce) by poisoning of the foliage of the vines and of the flowers of *Thymus* the species appeared again this year in scanty numbers.

Opatroides punctulatus Rttr. — This beetle, which has been previously reported (cf. this *Bulletin*, 1930, No. 10, p. 146 and 1931, No. 1, p. 5), is a pest in the neighbourhood of Barce to the tomato plantations, gnawing the peduncles of the fruit.

Poisoned bran, which is the most effective means of controlling *Tenebrionidae*, was spread in the plantations free from weeds.

Egypt: Occurrence and Movements of Locusts *(Schistocerca gregaria)* (1).

The red swarms, reported late in May 1931 from Sinai, the Eastern Desert Kena and Assuan Provinces, were reinforced by others coming from the East and South East. During the first week of June 1931, the situation looked somewhat serious on the Red Sea littoral between Hurgada and Koseir.

The general line of migration was towards the South and South West. In a few cases, however, the locusts influenced by the prevailing winds went to the North and the North West.

Some of the invaders reached the Nile Valley at Girga, Kena and Assuan and were recorded as far west as Kharga Oasis.

After June 11th. no fresh arrivals were reported until the 24th. when a swarm about 200 × 50 metres appeared at El Derr coming from the East. They settled only for a while and then returned to the East.

The two fighting parties working on the Red Sea littoral destroyed a big percentage of the fliers. Scouting the desert region between the Red Sea and the Nile has been going on all the time.

In a few cases the locusts settled for a short time on cultivated crops and trees but were soon either destroyed or driven away.

A thorough inspection of all cultivated localities visited by the locusts showed that they had inflicted but very little damage.

At present there are no locusts in the country and we do not expect any more at least for this season.

(1) Communication from the official correspondent of the Institute, Mr. E. BALLARD, Chief Plant Pathologist, Plant Protection Section, Ministry of Agriculture, Cairo, Egypt.

United States of America : Outstanding Entomological Features (1).

The following notes refer to June, 1931.

The severe armyworm (*Cirphis unipuncta* Haw.) outbreak reported from Texas as far northeastward as Virginia in May became serious during the month of June in the East Central States westward to Iowa. In the East Central States this insect is doing considerable damage to small grain and corn.

The unusual cutworm prevalence that developed during May progressed through the early part of June, reports of serious damage to a great variety of crops having been received from Connecticut southward to Virginia and westward to Colorado and Utah. The most serious phase of this cutworm development is an outbreak of the variegated cutworm (*Lycophotia saucia* Hbn.) which extends from southern Nebraska across Kansas and into Oklahoma and Arkansas.

During June grasshoppers developed to such an extent as to require control measures in northwestern Minnesota, throughout the two Dakotas, southward through Nebraska to north central Texas, and westward into the Great Basin region. There is a local outbreak in Klamath and Lake Counties, Oregon, where 25,000 pounds of poisoned bran mash are being distributed daily for their control.

Wireworms have been reported as doing rather severe damage to corn in Vermont and Pennsylvania and to a variety of crops from New York southward to Maryland and westward to Iowa and Nebraska. The wireworm *Heterodereslaurentii* Guer. more seriously damaged the commercial Irish potato crop of Alabama than it has in any year since its discovery in that State.

The Hessian fly (*Phytophaga destructor* Say) is apparently decidedly on the increase in the East Central States, with scattered serious infestations in Nebraska and Kansas. Rather heavy infestations of spring wheat by this insect are reported from the Willamette Valley of Oregon.

A rather unusual infestation of wheat by the tenebrionid *Blapstinus gregalis* Casey in the region north of Great Falls in Montana occurred during the month. In the infested fields as many as 100 beetles to the square yard have been observed.

During the last week in June recently hatched nymphs of the chinch bug (*Blissus leucopterus* Say) were observed in the heavily infested area extending from western Ohio to southeastern Kansas. The outbreak this year seems to be more severe than has been recorded for several years.

The corn ear worm (*Heliothis obsoleta* Fab.) became seriously destructive in the Gulf region and the lower Mississippi Valley during the early part of the month and was first observed in Nebraska about June 10 and in Maryland June 15.

More damage has been occasioned to corn by sod webworms (*Crambus* spp.) in the East Central States than has occurred in a number of years, very serious damage being reported from Ohio westward to Iowa.

The velvetbean caterpillar (*Anticarsia gemmatilis* Hbn.) appeared in the Everglades of Florida on June 10. This is about two weeks earlier than in 1930.

During the early part of June the rosy apple aphid (*Anuraphis roseus* Bak.) developed to serious proportions in southern New England, and in the Middle Atlantic and East Central States extending southward to Arkansas. Very heavy infestations by this insect are also reported from the Pacific Northwest.

First side-worm injury by the codling moth (*Carpocapsa pomonella* L.) was

(1) Communication from the official correspondent of the Institute, Mr. J. A. Hyslop, Senior Entomologist in Charge, Insect Pest Survey, transmitted by the Acting Chief, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

reported from Massachusetts about June 16. By the middle of the month eggs were hatching in the Hudson River Valley of New York and by the third week of the month they were hatching in numbers in western New York. Side-worm injury had started in southern New Jersey by June 9. From the Hudson River Valley southward to Georgia the codling moth seems to be unusually abundant. Very heavy infestations are also reported from the greater part of the East Central States westward to Nebraska and Kansas. In the Pacific Northwest the codling moth situation is more serious than it has been for several years.

Apple leafhoppers are doing considerable damage in the Northeastern and Middle Atlantic States southward to North Carolina.

The oriental fruit moth (*Laspeyresia molesta* Busck) situation on the whole seems to be much less serious than at this time last year.

Although the light infestation of the plum curculio (*Conotrachelus nenuphar* Hbst.) reported in May prevailed over the South Atlantic States infestation by this insect developed to rather serious proportions in the Hudson River Valley and Connecticut. The first beetle of this year's generation to be observed in a pupal cell was seen at Fort Valley, Ga., on June 1. The first transformation reported last year was on May 23, which itself was considered late.

Considerable damage was done in southern Georgia to pecans by the pecan leaf case bearer (*Acrobasis juglandis* LeB.) while in Florida the nut case bearer (*Acrobasis caryae* Gr.) destroyed over 75 per cent of the crop about Jacksonville. In the vicinity of Albany, Ga., the nut case bearer infestation is extremely light.

The hickory shuck worm (*Laspeyresia caryana* Fitch) on pecan is occasioning considerable alarm in parts of Georgia and Mississippi.

The Mexican fruit worm (*Anastrepha ludens* Loew) was found infesting locally grown fruit at Matamoros, Mexico, and in a grove near Mission, Texas.

The seed corn maggot (*Hylemyia cilicrura* Rond.) was rather destructive in New York and the East Central States southward to Kentucky and westward to Nebraska.

The cabbage maggot (*Hylemyia brassicae* Bouché) is occurring in outbreak numbers in Connecticut, New York, and New Jersey, with serious damage also reported from Indiana, Kentucky, and Wisconsin. In Connecticut one grower estimated his loss at between 2,000 and 3,000 plants while plants in unscreened beds in New York State were damaged from 15 to 60 per cent.

The Colorado potato beetle (*Leptinotarsa decemlineata* Say) continued to be unusually abundant in the Middle Atlantic States westward to Illinois, and an unusual outbreak of this insect was reported from northwestern Iowa.

The potato aphid (*Illinoia solanifolii* Ashm.) is much more abundant on potatoes and tomatoes on the eastern shore of Maryland and Virginia than usual. This insect is also reported as being very abundant in Indiana and Ohio.

The Mexican bean beetle (*Epilachna corrupta* Muls.) is causing serious damage in Hartford County, Conn., and became so numerous in parts of New Jersey that the supply of insecticides for their control was exhausted.

The asparagus beetle (*Crioceris asparagi* L.) was very troublesome from Connecticut westward to Iowa, complete devastation taking place at many points. This insect is also becoming a serious pest in Colorado and California.

Throughout practically the entire country, from New England to Florida and westward to Iowa and Nebraska, the striped cucumber beetle (*Diabrotica vittata* Fab.) is being reported as unusually destructive.

From central Ohio westward to Wisconsin the pea aphid (*Illinoia pisi* Kalt.) is so abundant that the pea crop is seriously threatened.

The potato tuber worm (*Phthorimaea operculella* Zell.) was found attacking tobacco at several places in Kentucky during the third week in June. This is said to be first record of the occurrence of this insect in that State.

A very heavy emergence of Brood V of the periodical cicada (*Tibicina septendecim* L.) is reported from the upper end of Long Island. The occurrence of Brood V in New York State was first definitely established by W. T. Davis in 1914, although there are a few old records of this brood's appearing there in 1897.

Canker worms (Geometridae) have defoliated large areas of forest lands in the Red River Valley of North Dakota and are much more numerous than usual in parts of Minnesota, Iowa, Nebraska, and Kansas.

The elm leaf beetle (*Galerucella xanthomelaena* Schrank) is prevalent in southern New England and is appearing in large numbers in Rhode Island.

India: A New Virus Disease of *Dolichos biflorus* (1).

A new virus disease of *Dolichos biflorus* L. was observed in 1930 in a plot on the College Farm, Poona. Most of the vines were badly affected, although there was considerable vegetative growth. The disease is said to be very serious and is generally prevalent in the Bombay Presidency. It has also been observed causing severe damage to *Dolichos lablab* L. in Gujarat.

In general appearance the disease resembles the mosaic disease of the bean, *Phaseolus vulgaris* L. The leaves show chlorosis, clearing of the veins, blistering and downward cupping of the lamina. Our observations indicate that the seedlings develop these symptoms on the pinnately trifoliate leaves, while the first two oppositely placed leaves are always normal in appearance. The leaves dry towards the end of the season. There is considerable shedding of flowers in the plants affected with mosaic, and consequently the yield is much reduced. The setting of pods is very defective, and a large number of them remain sterile. The affected plants are rarely killed but continue to vegetate.

No attempts have yet been made to effect transmission of the disease by the inoculation of leaves with juice expressed from mosaic-affected plants. However, in tests made in 1930 it has been ascertained that the mosaic virus can be transmitted through the seed of *Dolichos biflorus* L. In these tests as high as 25 to 40 per cent of seed infection was found in different seed lots purchased from the market.

India: *Rhizoctonia bataticola* on Sorghum in the Bombay Presidency (2).

In the past winter season sorghum crop was extensively damaged in East Deccan. In many places damage to the crop was very serious reducing it to a 4-anna crop. *Rhizoctonia bataticola* has been isolated from the affected plants. This disease is also serious near Broach, Gujarat and is called there by the local name of 'Kharkharia'. It is suspected that tobacco and cotton also suffer from this disease in Gujarat.

(1) Communication from the official correspondant of the Institute, Dr. B. N. Uppal, Plant Pathologist to Government, Bombay Presidency, Poona.

(2) Communication from the official correspondent of the Institute, Dr. B. N. Uppal, Plant Pathologist to Government, Bombay Presidency, Poona.

Palestine: Insect Pests (1).

During the years 1929 and 1930 the survey of almond producing areas, carried out to determine, inter alia, the percentage of trees severely damaged by *Capnodis carbonaria*, Klug. (Buprestidae), resulted in 9,265 trees being uprooted as non-productive owing to the attacks of this pest, and during the season of emergence of the adult beetles, 39,347 of these insects were collected by hand and destroyed. The work proceeds during 1931.

The beetle pest of apricots known as *Cerambyx dux* Fald. (Cerambycidae) has been investigated in considerable detail and an adequate control method advised.

The life histories and control of the two grape pests known as the Bud and Leaf Moth, *Theresia ampelophaga*, Bayle and the Grape Berry Moth, *Polychrosis botrana*, Schiff., have been studied locally.

The harmful fig pest known as *Ceroplastes rusci*, L. (Coccidae), has been controlled successfully by fumigation with hydrocyanic-acid gas. The operation is performed during the autumn months after removal of the crop. Costs of transport of fumigation material, owing to the isolated position of some fig-producing areas in the hills, is high.

A scientific system of checking the results of fumigation of citrus against the locally-termed Black Scale (*Chrysomphalus aonidum*, L.) has been instituted. This system embodies exact instructions for the taking of samples of leaves and fruit from fumigated trees ; the percentage of trees to be examined in a fumigated grove ; and treatment of such samples for checking purposes. Samples are taken 10 days after fumigation. Examination of scale from fumigated trees is performed by binocular microscopes.

Since the inception of fumigation of citrus on a scientific basis in 1928, 233,000 trees have been treated. The work has been performed by the Government. It is proposed to hand the work over in the future to private firms, under contract, as it has expanded very considerably.

In Northern Palestine, where Black Scale is widely spread and is a major pest of citrus, all extensive plantings of this crop have been photographed aerially and from these maps plans have been completed which indicate, with exactness, location of individual groves, number of trees therein and owner's name. This will simplify, enormously, future operations in such areas.

The locust campaigns of 1928, 1929 and 1930 have shown that in Palestine the principal and most economic means of locust control are as follows :— For control of flying locusts flame-guns give superior results if utilized during the early morning hours when the insects are torpid. For the eggs double ploughing is well worth while in suitable soil and when supplies of animals and implements are easily procurable. For the young locusts poison bait (Sudan formula but not previously dried) combined with the use of zinc sheets barriers.

Palestine is not a large country but it has a dense rural population in most areas and means of communication and transport are excellent. These factors simplify to no mean extent the successful prosecution of a locust campaign.

(1) Communication from the official correspondent of the Institute, Mr. E. R. Sawer, M. A., B. Sc., Director of Agriculture and Forestry, Jerusalem, Palestine.

Southern Rhodesia : Alternaria Leaf Spot of Tobacco (1).

During the past season, a serious leaf spotting of tobacco occurred in several districts doing very considerable damage to individual crops. Only two previous records of the disease have been received, but it is probable that scattered outbreaks may have occurred and not been reported.

The chief symptom is the appearance of small brown spots upon the lower leaves at the time when the plants are just coming into flower. The spots enlarge up to a diameter of as much as 2 cm., the modal diameter being about 1 cm. They are chestnut or vandyk brown in colour, depending on the variety of tobacco, and frequently shew a light brown, or even white, area in the centre, when the disease strongly resembles Frog Eye (*Cercospora nicotianae*) from which it is difficult to distinguish without the aid of a microscope. Sometimes, but not always, zonations are present in the darker brown parts of the lesions. Dark spots upon stem and midribs and the rapid spread of the disease to the uppermost leaves and seed pods are characteristic of Alternaria leaf spot.

The cause of the disease has been shown to be due to an *Alternaria* which has been referred to *A. tabacina* Ell. and Ev. (Hori), but the fungus does not appear to be the same as *Macrosporium tabacinum* Ell. and Ev. reported from white speck of tobacco.

It is probably identical with the organism causing a similar leaf spot, recorded by Gulyás (Kisérletügyi Közlemények, xxxiii, 2, 1930) in Hungary.

Serious loss in quality of leaf is also attributed to the disease which apparently extends the area of infection during the process of curing.

Varieties affected include Hickory Pryor (severely), Orinoco White Stem, Gold Leaf, Warne and a Turkish variety.

Conditions favouring the disease are continued and heavy rain followed by bright periods, which induce rapid growth in the plant.

' Priming ' off infected leaves has not proved successful as a control measure. Investigations are proceeding.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany (2). — By Decree No. 10 of 25 June 1931 the Decree of 27 September 1928 concerning the importation of barley coming from the United States of America (see this *Bulletin*, 1929, No. 7, p. 101) will remain in force until 31 December 1931.

Australia (Queensland). — By an Order dated 14 May 1931 the Government of Queensland has authorised the Committee of Direction of Fruit Marketing to offer a prize of £ 1000 to any person who shall discover an effective method of con-

(1) Communication from the official correspondent of the Institute, Mr. J. C. Hopkins, B. Sc. (London), A. I. C. T. A. (Trinidad), Plant Pathologist, Department of Agriculture, Salisbury, Southern Rhodesia.

(2) Communication from the Biologische Reichsanstalt für Land- und Forstwirtschaft, Berlin Dahlem, official correspondent of the Institute.

trolling banana thrips (*Scirtothrips signipennis* Bagnall) and has fixed the regulations for the competition. (*Queensland Government Gazette*, Brisbane, 16th May, 1931, Vol. CXXXVI, No. 152, p. 2064).

Cyprus. — By Order in Council No. 1421 of 23 April 1931 regulations have been provided for the importation into the island of plants and plant parts, whether fresh, dried or preserved, also of other plant products, soil, mould, sand, fertilisers, etc. The Order contains models of the certificates of inspection and fumigation required to be issued by the competent authorities of the country of origin. (*The Cyprus Gazette*, Nicosia, 1st May, 1931, No. 2131, pp. 323-325).

Italy. — By Royal Decree-Law No. 799 of 12 June 1931 a reduction of the normal trade tax on fertiliser and anti-parasitic materials directly utilisable in agriculture is provided. The anti-parasitic materials include copper sulphate, ' Caffaro ' powder and paste and refined sulphur. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 1° luglio 1931, anno 72°, n. 149, p. 3248).

*** The Law No. 987 of 18 June 1931, contains enactments relating to the protection of cultivated plants and agricultural products against diseases and pests and to the services relating thereto. The Law No. 94 of 3 January 1929 with the same title (cf. this *Bulletin*, 1929, pp. 22-28) is therefore abrogated, with the exception of Art. 19.

Arts. 1-9 of the new Law concern the inspection of nurseries, of seed selection establishments and of the exportation of plants, plant parts and seeds. Art. 1 enacts *inter alia* that plant nurseries whose products are intended even in part for foreign export must possess, in addition to the requirements of the old Law, those of the International Conventions in force.

With a few modifications, many only in form, Arts. 2, 3, 4 and 5 of the old Law have been inserted in the new. The following addition has been made to Art. 5 : — Producers, nurserymen and tradesmen who have obtained from the Prefect of their Province the prescribed authorisation for their business may sell their produce or merchandise also in the public markets, either directly or through the agency of a third party, and in conformity with the rules of guarantee which shall be fixed by the regulations for the application of the new Law.

Arts. 6, 7, 8 and 9 of the old Law have also been preserved with slight remodelling.

Arts. 10-14 of the Law now in force concern the works and ' Consorzî ' for crop protection which were dealt with in Arts. 10, 11, 12, 14 and 16 (in part) of the old Law.

Arts. 18-20 of the new Law deal, mainly from an administrative point of view, with the ' Consorzî ' for the improvement and increase of crops (Consorzî per la Viticoltura ', ' Consorzî per l'Olivicoltura ', etc.).

Arts. 21-35 of the new Law contain the general provisions (Commission for plant protection ; institutions and bodies formed on the disbanding of the Plant Protection Services ; administration, technical direction, etc. of the ' Consorzî ' for crop protection ; penalties for offences, etc.) which were the subject of Arts. 15, 16 (in part), 17, 18, 20-24 and 26 of the old Law. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 24 agosto 1931, anno 72°, n. 194, pp. 4190-4195).

*** By Ministerial Decrees of 31 July 1931 the Communes of Niella Tanaro, Mombasiglio (province of Cuneo) and Sicignano degli Alburni (province of

Salerno) have been declared infected with grape phylloxera. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 8 agosto 1931, anno 72°, n. 182, p. 4012).

*** In consequence of the United States Department of Agriculture having allowed to remain in force again during the current season of export of Italian chestnuts the provisions established by Order H. B. 215 of 14 June 1928 and the regulations fixed by the Department for the seasons 1929-30 and 1930-31, the Italian Ministry of Agriculture and Forests has decided to sanction for the current year the temporary regulations fixed in Circular No. 77 of 1 September 1930 (cf. this *Bulletin*, 1930, p. 172) (1).

Morocco (French Zone). - By Vizirial Decree of 10 June 1931 (23 moharrem 1350) whoever sells insecticides or fungicides, whether raw material or compounds, must state for the information of the purchaser at the time of sale or delivery, on a delivery note or on the detailed invoice, the precise name and composition of the products placed on sale, indicating the useful components and their per cent. proportion, and in addition all the indications necessary for the identification of the products.

The same indications must be given clearly on the wrappings and containers in which the goods are consigned to the purchaser, on the wrappings and containers in which the goods are placed prior to delivery, as well as on the prospectuses, instructions, advertisements, posters, price lists and trade documents. (Empire Chérifien. Protectorat de la République Française au Maroc. *Bulletin Officiel*, Rabat, 3 juillet 1931, XX[e] année, n° 975, p. 788-789).

*** By Decree of the Director General of Agriculture, Trade and of Land Settlement of 12 June 1931, all sellers of sulphur must show on the delivery note or on the invoice, on the wrappings, containers or packing material, and on the advertisements, bills or price lists, the degree of fineness and the form under which it is sold (rock sulphur, flowers of sulphur, ground sulphur, etc.), as well as the indication of pure sulphur content. (*Ibid.*, p. 789).

*** By Decree of the Director General of Agriculture, Trade and Land Settlement of 12 June 1931, all sellers of copper salts or other copper compounds or preparations with a copper basis, must show on the delivery note or invoice, on the wrappings, containers, or packing material, and on the advertisements, bills or price lists, the content in copper of the product sold.

For copper compounds intended to be utilised in the form of powder, it is necessary also to indicate the degree of fineness. (*Ibid.*, p. 789).

*** By Decree of the Director General of Agriculture, Trade and Land Settlement of 12 June, 1931, all sellers of arsenical products or of preparations containing such products, must show on the delivery note or the invoice, on the wrappings, containers or packing materials, and on the advertisements, bills, or price lists, their nature (arsenite of soda, arsenate of lime, etc.), their content in arsenic and the form in which the arsenic is present, either soluble or insoluble.

For insoluble arsenical compounds, the proportion of soluble arsenical compounds blended must also be shown. (*Ibid.*, p. 789).

(1) Communication from the Ministry of Agriculture and Forests to the International Institute of Agriculture.

*** A Vizirial Decree of 26 June 1931 (9 safar 1350) establishes special and exceptional gratifications for the technical staff of the external services of the General Department of Agriculture, Trade and Land Settlement, who are engaged in the locust control campaign. (*Ibid.*, p. 791).

Rhodesia. — The Government Notice No. 192 published on the 17 April 1931 prohibits the importation into Southern Rhodesia from any place overseas of unmanufactured broom corn derived from sorghum, whether green or dry, except under the authority of a special permit from the Minister of Agriculture and Lands, or his authorised substitute, the issue of which is subject to the condition that the straws must be detached, and the crowns from which they originate must be completely cut away or otherwise cut to shreds. (*The Rhodesia Agricultural Journal*, Issued by Authority of the Minister of Agriculture and Lands, Salisbury, Rhodesia, 1931, Vol. XXVIII, No. 5, p. 500).

Tripolitania. — By Governatorial Decree No. 4678 of 3 June 1931 the regulations governing the exportation of potatoes and tomatoes are established. The regulations require *inter alia* that produce for export shall be free from parasitic injury and other defects. (*Bollettino Ufficiale del Governo della Tripolitania*, Tripoli, 16 giugno 1931, anno XVIII, n. 13, pp. 760-765).

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NOTES

International Diplomatic Conference for the Protection of Birds Useful to Agriculture. — The Conference (see this *Bulletin*, 1931, No. 4, p. 57, which was arranged for 5 October 1931 at The Hague has been postponed to a later day at the instigation of the Government of the Netherlands.

Vth International Entomological Congress. — The Congress will be held in Paris in July 1932 under the Presidency of Professor P. Marchal, Director of the Central Entomological Station of Paris. There will be Sections devoted to Agricultural Entomology and to Forest Entomology.

Prof. ALESSANDRO BRIZI, *Segretario generale dell' Istituto, Direttore responsabile.*

DISCOVERIES AND CURRENT EVENTS *

Algeria: Control of Mole-Crickets (1).

The mole-cricket (*Gryllotalpa vulgaris*) may be regarded as the most serious pest of market gardens in Algeria. Almost the only control method used hitherto has been the application of carbon bisulphide on the bare ground a month before planting, but the cost of this treatment allows of its use only in certain cases.

Recent experiments carried out at Constantine, Fort de l'Eau, Aïn Taya and Oran have shown the high value of bait poisoned with zinc phosphide, which was recommended in Italy by Prof. E. Malenotti, Director of the Phytopathological Observatory in Verona.

The bait is composed of powdered maize (100 parts), water (20 parts) and zinc phosphide (5 parts) and has given entirely satisfactory results.

By spreading the bait in the evening at a rate of about 50 kilos to the hectare between the rows, on ground which has been previously watered, and immediately covering it over, complete and rapid destruction of the male crickets was effected without any damage to the plants.

This method of control should speedily enter into common practice in Algeria because in addition to its efficacy, it has the advantage of being really inexpensive, costing about 160 francs per hectare.

Cyprus: Downy Mildew of the Vine (*Plasmopara viticola*) (2).

A severe outbreak of this disease has occurred in 1931, probably due in a large measure to the unusually damp weather experienced during May and the early part of June.

This disease occurs to a small extent in some years but it is unusual for so severe an outbreak to occur and consequently vine growers are not in the habit of spraying vines, which has contributed to the spread of the disease this season.

Cyprus: Locust Campaign, 1930 and 1931 (3).

The first hatchings of Moroccan locusts (*Dociostaurus maroccanus*, Thnb), were reported on March 13th, 1930 eight days earlier than the previous year.

The campaign was again carried out largely by the purchase of locusts collected

* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Communication from the official correspondent of the Institute, Mr. DELASSUS, Crop Protection Inspector, Government General of Algeria, Algiers.

(2) Communication from the official correspondent of the Institute, Mr. H. M. MORRIS, M. Sc., F. E. S., Government Entomologist, Nicosia, Cyprus.

(3) Communication from the official correspondent of the Institute, Mr. H. M. MORRIS, M. Sc., F. E. S., Government Entomologist, Nicosia, Cyprus.

in hand nets, a total of 57,938 okes (nearly 72 ½ tons) being destroyed by this means. In addition poisoned bran bait was used over a number of areas, a total of about 62 tons of bran being used.

Moroccan locusts appeared to be rather more numerous than in the previous year and occurred in some outlying areas where their occurrence had not been recorded previously, or not for some years. The use of bran bait was found most convenient in such areas.

Calliptamus italicus, L. also occurred abundantly in some areas and were dealt with by the same methods and are included in the above figures.

Tettigonia viridissima, L., *Decticus albifrons*, Serv. and other large Tettigonids were also accepted for purchase, at a lower price than the locusts owing to their larger size, and 11,278 okes (rather over 14 tons) were destroyed by this means. When present in large numbers these Tettigonids cause serious damage to crops.

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First reports of hatching were received in 1931 about the same date (March 13th) as in 1930. The campaign was carried out on similar lines to that of the previous year.

The occurrence of Moroccan locusts (*Dociostaurus maroccanus*, Thnb.) was considerably less than in the previous year, only 29,815 okes (37 ¼ tons) being brought in for purchase. This decrease may be due to the occurrence of a short period of wet and relatively cold weather at the end of March, it being unusual for such weather to occur after the hatching. Bran bait was again used in several areas.

Calliptamus italicus, L. which hatches about a month later than *Dociostaurus*, was about as abundant as in the previous year, while the Tettigonids were less abundant and only 2067 okes (over 2 ½ tons) were purchased and destroyed.

Eritrea: Desert Locusts *(Schistocerca gregaria)* (1).

The flights reported in April 1931, coming from the Abyssinian frontiers, made their way in May to the Eastern low plateau where they became merged with the locusts hatched there and escaped destruction. The combined flights then crossed the valleys of the eastern slope leading to the high plateau.

Between the 9 and 10 May, numerous flights, partly consisting of young locusts and partly of individuals which had reached sexual maturity, were reported at Decamerè, in Hamasien, in the territory of the Mensa and in the Gundet (Seraè).

On 12 May, a flight, coming from Degghen, flew over the Hazamò, making its way over the frontier.

On 15 and 16 May, two flights were observed also on the western low plateau, one on the territory of Biscia and the other at Barentù, both coming from Abyssinia and making their way towards Adi Ugri.

On 24 May, a few locusts, coming from the east, flew over Elabered, making their way to Cheren.

On 26 May, locusts coming from the high plateau made their way towards the high Barca.

(1) Communication from the official correspondent of the Institute, Dr. A. De Benedictis, Head of the Agricultural Office of Eritrea, Asmara, transmitted by the Government of the Colony.

On 28 May, numerous locusts coming from Ghergher (Suela) after having destroyed the lands sown with maize in the districts of Medri Hebei, Dembè Uoddi, Filicos, Bigait, Grat Gaba, Danfaga, Cherenà Cudò and Hamasa (Deda), left the Hamasien territory, and made their way towards Seraè.

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During June 1931 locust swarms were reported also in the western plain. On 1 June a swarm coming from the Sudan passed over Omager flying east ; on the 16th and 19th more swarms were seen along the Barca and at Barentù.

On the 14th numbers of reddish locusts coming from the sea passed over Thiò, a district on the Red Sea coast.

On the 15th, 19th and 21st numbers of other swarms crossed into the territory of the Colony from Abyssinia. These locusts invaded Acchelè Guzai and the Seraè and then dispersed over the upland plateau.

On the 12th, 19th and 22nd swarms coming from the eastern plain flew towards the upland plateau, invading first the Hamasien and then the Seraè.

At Nacfa also on the 18th a swarm was observed coming from the west and flying part to the east and part to the southeast.

The reddish colour of the swarms of winged locusts showed they were not yet sexually mature, and no egg deposits were reported during the month.

The observation of the swarms is being continued as well as the destruction of any small centres of hoppers.

United States of America: An Outbreak of *Peronospora hyoscyami* on Tobacco (1).

An outbreak of *Peronospora hyoscyami* De By. on tobacco plant beds, the first reported in the United States since 1921, occurred in the spring of 1931. This is, of course, the well-known Blue Mold of tobacco in Australia. In contrast to the earlier outbreak which was confined to west Florida and two adjacent counties in Georgia, the disease this year was found in tobacco producing areas of six states.

Much interest was aroused by the presence of this unusual disease and its progress northward was carefully traced. There seems to have been a more or less regular periodicity in the successive outbreaks which followed each other at intervals of about two weeks. The first reports of the disease came from Louisiana and south Georgia, where the disease occurred on a few plant beds during the last half of March and the first half of April. About the middle of April the disease appeared almost simultaneously on a large number of plant beds in six counties of Georgia and within ten days had been found scattered over thirteen counties in this state. Early in May the disease was found for the first time in northwestern Florida and scattering infections were found in seven counties in the Coastal Plain region of North Carolina. By the middle of May the disease was found on approximately half the plant beds in several counties in North Carolina and had been reported from no less than sixteen counties, all of these on or near the Coastal Plain. By this time most of the plants in affected beds in Louisiana and South Georgia had largely recovered and less alarm was felt regarding the outcome of the disease. The disease continued to

(1) Communication from the official correspondent of the Institute, Dr. Neil E. Stevens, Senior Pathologist, Plant Disease Survey, Bureau of Plant Industry, United States Department of Agriculture, Washington.

spread northward, however, and during the first half of June was found in the Piedmont region of North Carolina, adjacent counties of Virginia and South Maryland.

In spite of the threatening aspect of this disease, relatively little damage resulted. In many of the infected plant beds when the disease was at its height not a single healthy plant could be found, and the whole bed had the appearance of having been scalded with hot water. Within ten days or two weeks, however, most of the plants had recovered and showed apparently normal growth. The actual economic loss will be very slight.

United States of America : Notes on Nematodes Injurious to Plants (1).

The increasing interest in plant diseases due to nematodes is evidenced by the unusual number of reports of such diseases received during the current summer. Most of these reports come to the Plant Disease Survey through the courtesy of Dr. G. Steiner who has made the determinations of the nematodes involved.

Tylenchus dipsaci, the stem and bulb nematode was intercepted January 8, 1930 in potatoes in ship's stores which are believed to have come from Prince Edward Island. If this assumption is correct it constitutes the first record of this parasite on potatoes in North America. In July, a severe but strongly localized infection of *T. dipsaci* on onions was discovered in Canastota, Madison County, New York. This is the first report of this nematode in New York State and the first authentic report on this host in the United States. Every effort is being made to eradicate the pest in this area. This same nematode was reported for the first time on Sweet William (*Dianthus barbatus*), and *Plantago maritima* from Oregon during April, and on strawberries in North Carolina during May, also on *Hypochaeris radicata* from the Island of Maui, Hawaiian Islands (Godfrey). The disease of Sweet Potatoes caused by *T. dipsaci* appeared again in New Jersey where it is becoming generally known as the ' brown ring ' disease. Observations to date indicate the disease is not widespread in New Jersey but where it occurs causes considerable loss in storage.

Aphelenchus fragariae, the cause of the cauliflower disease of strawberries in Europe (the disease is usually known as ' Dwarf ' in the United States), was found to survive the winter on strawberries in southeastern Massachusetts.

Tylenchus pratensis de Mon. which is an endoparasitic form on roots, rhizomes, and tubers of many plants, is known to be widespread in Europe and Northern United States. Much interest is attached to finding this nematode causing a disease of yams shipped from West Africa as this is the first report from Africa and the first from yams (*Dioscorea* sp.).

Tylenchus pratensis was found on tobacco in North Carolina by Dr. S. G. Lehman during July, 1931. This is the first report of *T. pratensis* on tobacco. Dr. Lehman found the disease caused by the nematode was present in several fields in each of two counties. He described the conditions in diseased fields as follows : " The plants are very uneven in growth and the majority of them show slight to extreme stunting. The lower leaves are turning yellow and becoming necrotic around the margins. Although the grower has made a special effort culturally to stimulate the growth of these plants they have failed to grow as they should. One can readily pick out the diseased plants by their stunted appearance and the lower leaves with

(1) Communication from the official correspondent of the Institute, Dr. Neil E. Stevens, Senior Pathologist, Plant Disease Survey, Bureau of Plant Industry, United States Department of Agriculture, Washington.

their yellow margins. The grower states that this tobacco has not grown as it should during the entire season. All summer it has shown a strong tendency to wilt, beginning about 9.00 o'clock in the morning and extending through the heat of the day until late evening. The leaves come up at night but wilt down again on the succeding day. Many of the fine rootlets are killed back for a long distance from the tips. On the larger roots isolated lesions of various sizes are evident. The colour is distinctly brown, not black, and no spores are present such as are found in lesions of the black root rot diseases ".

Aphelenchus parietinus. During March and April, 1931, extensive plantings of fifty varieties of cotton seed were made under the supervision of C. H. Arndt of the South Carolina Agricultural Experiment Station at Clemson College and Florence, South Carolina, to determine the relative ability of the various varieties or strains to produce stands under the low temperature of the early portion of the growing season. The germination of the seed was very variable, but small stands of most of the varieties were secured, particularly at Florence. Later the seedlings showed the typical symptoms of damping-off. From 60 to 90 per cent. of these seedlings were killed in the early stages of their development. Previous examinations of similarly diseased seedlings indicated that the lesions were not of the usual type produced by the fungi causing damping-off ; although species of *Corticium* and *Fusarium* always developed when such seedlings were washed and placed on nutrient agar. Nemas were invariably found in such lesions. Several hundred seedlings, selected at random, were examined (by C. H. Arndt and two associates) from both of the places above noted with the following results as to the type of injury found on the seedlings : Nemas 70 to 80 per cent. ; *Corticium* (typical sore-shin) 8 to 15 per cent. ; *Fusarium* sp. 5 to 10 per cent. (species determined by Dr. C. D. Sherbakoff as *F. vasinfectum*, *F. viride*, *F. martii-minus*, *F. moniliforme*), an undetermined phycomycete 1 to 3 per cent. ; normal plants, without lesions, not above 10 per cent.

United States of America : Outstanding Entomological Features (1).

The following notes refer to July, 1931.

The paramount feature of the month is the devastating grasshopper (Acrididae) outbreak in the Great Plains which is said to be the most serious of any since the early settlers were demoralized by the invasion of the Rocky Mountain locust, *Melanoplus spretus*, in the decade between 1868 and 1880. Serious grasshopper outbreaks were quite generally reported from New York westward to Idaho, Nevada, and Arizona, and southward to Arkansas, Oklahoma, and Texas.

The severe outbreak of the variegated cutworm, *Lycophotia margaritosa saucia* Hbn., which was reported during June in the West-Central States was followed in July by a similar outbreak of this same insect in the North-Central States.

Late sweet corn on over one thousand acres of land in San Diego and Los Angeles Counties, Calif., was practically ruined by an undetermined climbing cutworm (Noctuidae).

The fall armyworm, *Laphygma frugiperda* S. & A., appeared in destructive numbers in the Everglades of Florida and in the Mississippi delta of Louisiana during July. This is two months later than it appeared in destructive numbers in the Gulf Region last year.

(1) Communication from the official correspondent of the Institute, Mr. J. A. Hyslop, Senior Entomologist in Charge, Insect Pest Survey and Public Relations, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

The painted lady butterfly, *Vanessa cardui* L., was quite generally reported from New England to the Dakotas, the larvae feeding on hollyhock and burdock.

The chinch bug, *Blissus leucopterus* Say, seriously damaged corn in southern Illinois, central Missouri, and southern and central Kansas. It also did some damage to this crop in northern Ohio. This insect seems to be building up an abnormal population north of the normal chinch-bug belt in South Dakota and Iowa.

The corn ear worm, *Heliothis obsoleta* Fab., was more numerous during July in the North-Central States than it has been for several years and in Nebraska is doing more damage during this July than any July in the past 30 years.

An interesting account of the variegated fritillary (*Euptoieta claudia* Cram.) doing commercial damage to beans, sweetpotatoes and melons in Tennessee was reported in late June.

The establishment of a considerable colony of *Bruchus brachialis* Fahraeus attacking vetch in the field near Haddon Heights, N. J. and infested material from Delaware and Maryland was discovered during the month.

The peak of the 1st-brood codling moth, *Carpocapsa pomonella* L., emergence in the Hudson River Valley occurred about July 7. The second brood moth started to emerge in central Ohio about July 9, but up to July 20 no emergence had been observed in the fruit belt along Lake Erie. Severe infestations were reported quite generally in the eastern part of the United States. Band counts in western Illinois indicate that the population is 10 times as great as at the same time last year, and in eastern Illinois about 25 times as great.

Considerable damage is being done by the grape leafhopper, *Erythroneura comes* Say, from New Jersey westward to Ohio.

Blister beetles (Meloidae) as usual are now attracting a great deal of attention on a variety of crops in the East-Central and West-Central States, Say's blister beetle, *Pomphopoea sayi* Lec., becoming quite numerous in New England and in New York.

The false chinch bugs, *Nysius ericae* Schill., are very numerous over a large area in Iowa and Nebraska. They are also numerous in parts of Texas, Colorado and South Carolina.

Colorado potato beetle, *Leptinotarsa decemlineata* Say, was discovered on a city lot in Ogden, Utah, during late June. By the end of July it appeared that this infestation had been eliminated.

Potato leafhopper, *Empoasca fabae* Harr., with the associated hopperburn is prevalent in the East-Central States, southward to Kentucky and westward to Iowa and Minnesota.

Larvae of the Mexican bean beetle, *Epilachna corrupta* Muls., were collected during the month in Washington County, Rhode Island. Considerable damage was done by the first generation of this insect in Connecticut. It was reported for the first time from Esopus and Port Ewen, New York. In the older infested region in the southern Middle Atlantic States but comparatively little damage is being done by this insect.

The squash bug, *Anasa tristis* De G., is being reported much more frequently than last year from the Middle Atlantic States, southward to Georgia, Alabama and Mississippi. It was also reported as doing serious damage in Iowa and Utah. In Idaho, where it was first discovered in 1929, it is now quite generally destructive over the southwestern part of the State.

A serious outbreak of the beet webworm, *Loxostege sticticalis* L., is occurring in parts of Wyoming. The insect is also unusually abundant in Montana, and

North Dakota. In Wyoming the insects seriously damaged beans into which they migrated from nearby fields.

The elm leaf beetle, *Galerucella xanthomelaena* Schr., was reported during July from New Hampshire southward along the Atlantic Coast to Maryland with occasional outbreaks in Ohio and Kentucky.

The spruce budworm, *Harmologa fumiferana* Clem., is defoliating large areas of balsam fir and several species of pine in Wisconsin and parts of North Dakota. This insect was discovered for the first time in Cody Canyon, Wyo., in 1926, and since that time it has spread over a tremendous acreage and has destroyed large areas of Douglas fir.

About 43,000 acres of poplar has been defoliated in Maine by the Poplar leaf roller, *Cacoecia conflictana* Walk.

Eye gnats, *Hippelates* spp., have been very annoying along the South Atlantic seaboard from Maryland to Georgia and around the Gulf to Mississippi.

Hungary: Locusts (1).

After a complete respite since 1926, during 1930 the first signs of the influence of a series of dry years on the development of locusts began to be apparent. The Italian locust (*Calliptamus italicus*) in particular made its appearance in 1930 in several places ; the swarms were small however and there was no serious damage nor was there need for large-scale control measures.

The Moroccan locust (*Dociostaurus maroccanus*), which attacks grain crops also appeared in 1930. It invaded only five communes however and only in small numbers. The Hungarian Entomological Station and the Ministry of Agriculture took the necessary steps to prevent risks of a recurrence in the following year.

In 1931 however a progressive development of the various species occurred. *Calliptamus italicus* made its appearance practically throughout the country and in such numbers that it was often necessary to protect the fodder, root and leguminous crops by collecting or burning the locusts. By these means serious damage was avoided.

The Moroccan locust also developed in great numbers in 1931. Although this species, which is considered the most destructive has invaded 27 communes more or less seriously this year it has certainly not yet reached its maximum development. In the single commune of Sövényháza in the ' Comitat ' of Csongrád the locusts invaded an area of some hectares in such mass that they were soon short of food and attacked the neighbouring wheat crops. Control measures were at once undertaken with machines fitted with wire brushes and had such good results that, at the end of the operations, it was found that the loss was confined to only slight damage to 5 hectares of wheat distributed among several estates.

From the degree of infection of the invaded centres the need for a more intensified campaign in 1932 is to be expected. All the necessary measures that are possible in the difficult economic situation will be taken to prevent a locust invasion in 1932.

As was to be expected from biological and ecological knowledge of the Orthoptera, other species also have extended their attacks this year. The most serious have been *Gryllus desertus* and *Platycleis griseus*. They have been controlled in their breeding grounds (pasture and meadowland), the former by means of arsenical sprays, the latter with tooth-harrows.

(1) Communication from the official correspondent of the Institute, M. G. Bakó, Director of the Royal Hungarian Entomological Station, Budapest.

India: Some Fungal Diseases of Farm Crops Recently discovered in the Punjab (1).

(1) Grain smut (*Sphacelotheca Sorghi* (Lk.) Clinton) of jowar (*Andropogon Sorghum* Brot.). — This disease has been under observation for the last two years. It causes damage to the extent of 30-50 per cent in Dera Ghazi Khan District, South-West of the Punjab near hills. As the disease is carried by means of spores, which stick to the surface of the grain, treatment with copper carbonate dust at the rate of two ounces for twenty pounds of grain has been tried and found to be very effective.

(2) Long smut (*Tolyposporium filiferum* Busse) of jowar. — This disease was noticed in 1929 in the Multan District, South-West of the Punjab. Usually it occurs in Sind in the Bombay Presidency. Although it is not generally found in this Province, but it is likely to spread. The life-history of the fungus is not fully worked out and the study will be undertaken as soon as possible.

(3) Flag smut of wheat (*Urocystis Tritici* Koern.). — This disease has been reported for the first time from Ropar Tahsil in the Ambala District. In some places the extent of occurrence is as high as 25 to 30 percent. In 1930 it was observed in traces in Gurdaspur. Generally it appears in the sub montane tracts and has not been found in the plains. Measures for the control of the disease by means of disinfection of seed will betaken.

(4) Diseases of grape vines (*Vitis vinifera* Linn.):

(i) Black-rot of grapes (*Guignardia Bidwellii* (Ellis) Viala and Ravaz). — It affects the fruit of the grape vine commonly in the Punjab and a considerable damage has been done. Spraying with Bordeaux mixture has been found useful.

(ii) Grape anthracnose (*Glocosporium rufomaculans*). — This disease is found associated with Black-rot and affects all the green parts of the vine. The fruit and the shoots are, however, more affected. Bordeaux mixture has been found useful in this case also.

India: A New Minor Pest on Cotton in Burma (2).

A Capsid bug, not identified, has been observed to occur in large numbers and to breed on Cambodia and Acala cottons at Mandalay.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany (Hamburg) (3). — By Police Order of 20 June 1931 the clearing of thistles on 'Geestlande' before the 1st July of each year has been made compulsory; the owner as well as the usufructuary of the land will be held responsible for the carrying out of the Order. In the event of anyone failing to clear the thistles within 3 days of receiving a written notice to that effect the Commune will be authorised to carry out the work at the expense of the offender.

(1) Communication from the official correspondent of the Institute, Mr. R. S. L. Jai Chand Luthra, M. Sc., D. I. C. (London), I. A. S., Professor of Botany, Punjab Agricultural College, Lyallpur.

(2) Communication from the official correspondent of the Institute, Mr. C. C. Ghosh, B. A., F. E. S., Entomologist, Agricultural College, Mandalay, Burma.

(3) Communication from the Biologische Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, official correspondent of the Institute.

Italy. — By Decree of the Ministry of Agriculture and Forests, dated 21 June 1931, a competition has been opened for the compilation of a 'Manual of diseases of crop plants' and a 'Manual of insect pests of crop plants' for use in the instruction of the peasants. The successful competitor will receive an award of 10,000 liras for each volume, and there will be two second prizes of 2000 liras each for each volume. The closing date for the competition is 31 December 1931. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 24 settembre 1931, anno 72°, n. 221, p. 4692).

*** By Ministerial Decree of 16 September 1931 the provincial Hunting Commission of Sassari has been authorised to carry out a wholesale slaughter of wild boars in the 'La Nurra' district to reduce their numbers which have become a danger to farming. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 22 settembre 1931, anno 72°, n. 219, p. 4641).

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[*Coniocybe nivea*, *Calicium* spp., *Acrospermum* spp., *Caliciopsis* spp., *Sorica* spp., *Lagenula* spp., *Tripospora Tripos*, *Corynelia* spp., *Coryneliella consimilis*, *Microthyriella Rickii*, *Myriangella*, *Aulographum*, *Micropeltis applanata*, *Vizella appendiculosa*, *Diedickea singularis*, *Trichopeltina labecula*, *Micropeltis Flageoletii*, etc.].

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INTERNATIONAL BULLETIN OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

French West Africa: Desert Locust *(Schistocerca gregaria)* (1).

Swarms observed during July 1931 :—

1st, some swarms at Djiler, ' cercle ' of Kaolach, Senegal.

2nd, one swarm at Gouré, Niger.

3rd, a swarm at Savé, ' cercle ' of Savalou, Dahomey ; a swarm at Canton Sokone, Kaolach, Senegal and laying reported ; a swarm at Canton Sahoué, Mono, Dahomey ;

6th, a swarm at Abomey, ' cercle ' of Savalou, Dahomey ; a swarm at the villages of Tokoli, Akandjamé and Tori Heuvié, ' cercle ' of Allada, Dahomey.

7th, hatching of hoppers at Coundoum-Keur – Mandongokeur – Maniébé Kaolach, Senegal, two swarms in the region of Abomey-Calavi and in the Canton of Couffo, Dahomey.

8th, hatching of hoppers 2 kilometres north of the douar of Gouné, farm-school of Kakoro, ' cercle ' of Guidimakha, Mauritania.

11th, a swarm at Tikat-Birkelane, Senegal.

11th, 12th and 13th, swarms at Lougné, Djigui, Affia, Diandienne, Katakel-Petté, Kaolach, Senegal.

18th the whole region south of Savalou, Dahomey between the valleys of the Zou and the Onème, was invaded by numerous swarms causing serious damage to the maize crops.

20th, a swarm at Atar, Senegal.

Algeria: Desert Locust *(Schistocerca gregaria)* (1).

During July 1931 swarms were observed at Poligrac, Southern Territories on the 5th and 7th, a small swarm at Mokta-Déli, Méchéria on the 8th, and on the 16th a swarm at Moghrar-Tahtani, Aïn-Sefra.

Eritrea: The Desert Locust (*Schistocerca gregaria*) and the Tropical Migratory Locust (*Locusta migratorioides*) (2).

The swarms observed in June along the Barca and coming from the Sudan flew in the direction of the uplands, invading the Seraè and the Acchelè Guzai.

In addition to *Schistocerca gregaria* they consisted largely of *Locusta migratorioides*.

* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Communication from the Government General of Algeria, Algiers, to the International Institute of Agriculture.

(2) Communication from the official correspondent of the Institute, Dr. A. De Benedictis, Head of the Agricultural Office of Eritrea, transmitted by the Ministry of the Colonies (Office of Studies and Propaganda).

The first appearance of this latter species in the upland plain was on 14 July at Adi Ugri.

The masses of *L. migratorioides* after crossing over Adi Ugri flew in the direction of the plain of the Hazamò.

On the 4th and 8th numerous desert locusts (*S. gregaria*) entered the Colony from the Tigrai ; on the 11th and 15th they were seen in the neighbourhood of Senafè, flying towards the Assaorta.

Although the swarms coming from over the Abyssinian border were in July greatly less than those reported during the same period last year, from the Anglo-Egyptian Sudan large swarms of *L. migratorioides* daily invaded the territory of Eritrea and reached the uplands by way of the valleys of the Barca and the Gasc.

On 20 July a dense swarm of reddish-coloured locusts coming from the north (Aisera Valley) alighted in the Tabeh valley, and took flight again the same day towards the south.

About 10 July some swarms consisting of sexually mature locusts laid eggs in the plains of Faulinà, Gurgura and Mai Ceù ; on the 27th other egg deposits were reported along the Aidereso stream, and on the 28th and 29th in the district between Darotai and Agordat.

Towards the end of July hoppers appeared in the Faulinà plain, in the region between the Sittona stream and Gomò (Barentù) and between Ummed and Darotai (Agordat).

An active watch was kept in the egg contaminated zone, which agreed to intervention by the squadrons quartered in the different Commissariats of the Colony for the distribution of poisoned bait.

Serious damage was done to crops of dura, taf, dagussa and wheat in the Barentù territories, along the Anseba, in the Seraè and in the Scimenzana.

During August 1931 numerous swarms of locusts coming from the Anglo-Egyptian Sudan and from across the Abyssinian frontier passed over the territory of Eritrea. Those which came from the east were composed for the most part of *L. migratorioides*, those from the south of *S. gregaria*. Abundant hoppers were hatched in the territory of Barentù, along the Gasc, the Barca and in many other localities in the western plain.

In the uplands egg laying was reported on the 5th near the villages of Adi Mescela and Chila Mella in the Zaid Accolom (Seraè) and on the 19th in the plain of the Hazamò, and hatching at Adi Samiel (Seraè).

The swarms from Abyssinia, consisting of desert locusts, flew partly in the direction of the eastern and partly in the direction of the western plains. On the 1st, 4th, 20th and 21st dense swarms were observed near Saganeiti, Adi Caièh and Senafè flying towards the north-east ; on the 25th and 29th two swarms of sexually mature desert locusts were reported in the vicinity of Zula and Mount Ghedem (eastern plain). In the western plain on the 2nd a swarm of desert locusts flying west passed over Omager, and on the 3rd another swarm, also flying west, was seen near Tessenei.

On the 16th in the neighbourhood of Carora (eastern plain) great numbers of locusts coming from the north flew in the direction of the Sciamile plain.

It is to be noted that the swarms of *L. migratorioides* reported on the 12th and 17th flying east, had by the 20th reached the Red Sea. Unlike last year hoppers were not found in August in the upland plateau. The western lowlands on the other hand were badly infested.

The destruction of hoppers was actively continued by the Government gangs

and by the natives. In the territory of the Residency of Tessenei alone some hundreds of quintals were destroyed.

The risk of invasion in autumn by winged swarms coming from over the Abyssinian and Sudan frontiers still remains.

In August damage was reported to dura crops at Ducambia, Biscia and along the Anseba ; to the barley in the Maria Rossi ; and to dagussa and taf in the Tedrer (Acchelè Guzai), Decchi Bocrù and Aila in the Seraè.

United States of America : Outstanding Entomological Features (1).

The following notes refer to August, 1931.

The serious outbreak of grasshoppers in the Great Plains region which developed during July continued through the greater part of August, with lesser outbreaks over practically the entire country.

Red spiders (*Tetranychus telarius* L.) of several species attacking a great variety of plants, including forest and shade trees, truck crops, flowers, fruits, and shrubs, were reported from scattered localities across the northern part of the United States, from Maine through South Dakota and Idaho to Utah and Oregon.

A few specimens of the European corn borer (*Pyrausta nubilalis* Hbn.) was discovered for the first time in the State of Wisconsin, having been found in a field in Mosel township, Sheboygan County, on Lake Michigan.

The Japanese beetle (*Popillia japonica* Newn.) has been collected at Cleveland and Columbus, Ohio, these being the first records for this State.

The corn ear worm (*Heliothis obsoleta* Fab.) continued to be reported as unusually abundant from practically the entire corn-growing area of the United States.

A very unusual outbreak of chinch bugs (*Blissus leucopterus* Say) occurred at Windsor, Berkshire County, Mass. The outbreak was not extensive but the insects occurred in enormous numbers over a small area of corn and millet. The chinch bug situation as a whole in the Middle West has not changed materially since last month, although the insect has been reported this month from the lower tier of counties in Michigan and the southeastern corner of Minnesota.

The garden webworm (*Loxostege similalis* Guen.) was reported as seriously damaging alfalfa in scattered localities from Indiana to North Dakota and Iowa.

Sod webworms (*Crambus* spp.) was unusually destructive to lawns, golf greens, and pastures from Ohio westward to North Dakota and southward to Missouri and Tennessee.

The codling moth (*Carpocapsa pomonella* L.) situation has not changed materially since July. This insect continues to be seriously prevalent from New York southward to Georgia and in scattered localities from the East Central States, westward to the Pacific Northwest.

The oriental fruit moth (*Laspeyresia molesta* Busck) has been found at Springdale, Ark., this year. This is the first record from northwestern Arkansas.

The grape leafhopper (*Erythroneura comes* Say) was very seriously abundant throughout the northern part of the San Joaquin Valley in California where it is said that they will materially reduce the marketable tonnage of grapes.

The Pacific red spider (*Tetranychus pacificus* McG.) was extremely numerous late in July on grapes, deciduous fruits, and ornamentals in central California. Early in August this insect was practically eliminated by the predacious thrips *Scolothrips sexmaculatus* Perg.

(1) Communication from the official correspondent of the Institute, Mr. J. A. Hyslop, Senior Entomologist in Charge, Insect Pest Survey and Public Relations, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

An unusual damage to citrus is reported from Los Angeles, Calif. The false chinch bug (*Nysius cricae* Schill.) is seriously damaging young trees in groves adjoining wheat and weed fields.

The second finding of Cardin's whitefly (*Aleurodicus* [*Metaleurodicus*] *cardini* Back) in the United States is recorded. Specimens were collected on guava in moderate abundance at West Palm Beach, Fla. The first finding was in February, 1921, when specimens were collected by W. B. Wood, of the Plant Quarantine and Control Administration, in the Plant Introduction Gardens at Miami.

Blister beetles (Meloidae) were quite prevalent throughout the entire Mississippi Valley from Indiana, Minnesota, and North Dakota southward to Louisiana and Mississippi.

The plant bug *Eucylatus geniculatus* Reut., was recorded from the first time as a pest of tomatoes in Orange County, Calif. This insect is said to be injurious to tomatoes in the Hawaiian Islands.

Late in July the Mexican bean beetle (*Epilachna corrupta* Muls.) was found at Brattleboro, this being the first record for the State of Vermont. This insect is extremely prevalent and destructive throughout the northern part of its range, particularly north of the drought area of 1930.

Two coreid bugs, *Alydus curinus* Say and *A. pilosulus* H.S., were found seriously injuring beans in Georgia.

During the last week of August the sugar-beet webworm (*Loxostege sticticalis* L.) developed in rather large numbers in parts of North Dakota, South Dakota, and Utah.

Many fields of peppers in southern California have been damaged from 25 to 40 per cent. by the pepper weevil (*Anthonomus eugenii* Cano).

The weevil *Trichalophus didymus* Lec. has been found infesting strawberry crowns on the mainland at Tacoma, Wash. Heretofore this insect has only been known from Whibley Island, Washington.

For the first time in many years the potato tuber moth (*Phthorimaea operculella* Zell.) was injurious to tobacco in Dane, Rock, and Jefferson Counties, Wisconsin.

The bagworm (*Thyridopteryx ephemeraeformis* Haw.) was quite generally reported from Pennsylvania westward to Indiana and Kansas, and southward to Mississippi.

The saddled prominent (*Heterocampa guttivitta* Walk.) which has been in outbreak numbers in New England during the past few years, seems to have reached its peak during 1930 and this year is appearing in considerably reduced numbers.

The fall webworm (*Hyphantria cunea* Drury) is very abundant throughout New England and the Middle Atlantic States.

The elm leaf beetle (*Galerucella xanthomelaena* Schrank) was found early this spring in the Yosemite National Park in California. This is the first record of this insect in the Park.

The gladiolus thrips (*Taeniothrips gladioli* M. & S.) is very seriously injuring gladiolus in the New England, Middle Atlantic and East Central States.

Hungary: New or Rare Cryptogamic Diseases (1).

The following list leaves out of account the common diseases and enumerates only those rare or new for Hungary which were observed during 1929 and 1930. The diseases which are new for the country are marked with an asterisk :—

(1) Communication from the official correspondent of the Institute, Mr. Hermann KERN, Director of the Royal Hungarian Station of Physiology and Plant Pathology, Budapest.

1929

Pseudopeziza Medicaginis Sacc.	on *Medicago sativa.*
Fusarium niveum E. F. Sm.	» *Citrullus Colocynthis.*
Uromyces Fabae (Pers.) De By.	» *Lens esculenta.*
Bacillus Phaseoli E. F. Sm.	» *Phaseolus vulgaris.*
Bacillus Sorghi Burr.	» *Sorghum halepense* var. *sudanense.*
Erysiphe Cichoriacearum DC.	» *Cucumis sativus.*
Alternaria Brassicae Sacc.	» *Raphanus sativus.*
Sclerotinia sclerotiorum (Lib.) DeBy.	» *Helianthus annuus.*
* *Pseudomonas Pisi* Sack.	» *Pisum sativum.*
Ustilago Panici-miliacei (Pers.) Wint.	» *Panicum miliaceum.*
Peronospora Brassicae Gäum.	» *Brassica oleracea.*
Cladosporium macrocarpum Preuss.	» *Spinacia oleracea.*
Stigmatea Mespili Sor. f. *maculata* (Kleb.) Appel	» *Pyrus communis.*
Puccinia Caricis Reb.	» *Ribes Grossularia.*
Pseudomonas tumefaciens E. F. Sm. et Townsend	» roots of various fruit trees.
Ophiobolus graminis Sacc.	» grain crops.

Severe frosts early in 1929 caused considerable damage to many crops.

1930

Uromyces caryophyllinus (Schr.) Schröter	on *Dianthus* sp.
Heterosporium variabile Cooke	» *Spinacia oleracea.*
Puccinia Caricis Reb.	» *Ribes Grossularia.*
Pseudomonas spongiosa (Aderhold et Ruhland) Braun	» *Prunus Armeniaca.*
Exosporium palmivorum (Sacc.) Cooke	» *Phoenix* sp.
Actinonema Rosae Fr.	» *Rosa* sp.
Sphacelotheca Sorghi (Lk.) Clinton	» *Sorghum halepense* var. *sudanense.*
Pseudopeziza Trifolii (Biv.-Bern.) Fckl.	» *Trifolium incarnatum.*
Peronospora Trifoliorum DeBy.	» » »
**Sclerotinia Fuckeliana* DeBy.	» *Solanum tuberosum.*
**Botrytis cinerea* Pers.	» »
Oidium Euonymi-japonici (Arc.) Sacc.	» *Euonymus japonicus.*
**Sclerotinia Nicotianae* Oud. et Kon.	» *Nicotiana Tabacum.*
Ophiobolus graminis Sacc.	» cereals.

Mauritius: Notes on Insect Pests (1).

An invasion of caterpillars was noticed in April, May and June, after a cyclone which ravaged the island from the 5th to 8th of March, 1931. The cutworm *Prodenia litura*, F. and *Spodoptera mauritia*, Bdv. were specially troublesome in vegetable and tobacco plantations.

Papilio demodocus, Esp. developed abnormally in large numbers so as to constitute a serious pest to Citrus trees.

This invasion is imputed to the destruction by the cyclone of the natural enemies of the caterpillars combined with meteorological conditions favouring the development of these insects.

(1) Communication from the official correspondent of the Institute, Mr. VINSON, Scientific Assistant to the Entomological Division, Department of Agriculture, Reduit, Mauritius.

On the other hand Coccid pests such as *Icerya seychellarum*, West. have been entirely wiped out in certain localities by the cyclone and have not reappeared since.

Lachnosterna (*Phytalus*) *smithi*, Arrow. — This scarabeid beetle is still the major pest of sugar cane in certain parts of Mauritius. During the season 1930-31, 234 ½ million beetles and 64 million grubs were captured at a cost of Rs. 66,000 and Rs. 19,000 respectively.

A Scoliid wasp, *Elis* sp., the parasite of *Lachnosterna rodriguezi*, Waterh. and *L. gradaria*, Waterh. in Rodriguez was introduced from that country and it is hoped that in Mauritius this *Elis* will constitute a third parasite of *Lachnosterna smithi* already parasitised by *Tiphia parallela* (Smith) introduced from Barbados and *Elis thoracica*, F. introduced from Madagascar.

New South Wales: Plant Diseases (1).

Notes on plant diseases in New South Wales during year ending June 30th 1931 :—

CEREALS AND FIELD CROPS.

Wheat: Stem rust (*Puccinia graminis tritici*) developed extensively throughout the wheat belt and in some sections caused serious damage. Mild winter conditions caused succulent growth and heavy rains in the spring favoured development of the disease.

Flag-smut (*Urocystis tritici*) was widespread but generally caused less damage than in previous years.

Foot-rot (*Helminthosporium sativum*) caused serious reduction in yield in crops which were predisposed to the disease by " feeding off ", rust and frost.

Take-all (*Ophiobolus graminis*) was also recorded from a number of localities.

Leaf Spot (*Septoria tritici*) caused much more damage than usual, particularly in the later maturing varieties.

Diseases of less importance included Bunt (*Tilletia tritici*), Loose Smut (*Ustilago tritici*), Glume Blotch (*Septoria nodorum*), Basal glume rot (*Bacterium atrofaciens*) and Powdery Mildew (*Erysiphe graminis*).

Non-parasitic conditions included " haying-off and " tipping ", as a result of dry weather conditions and strong winds during the early stages of maturity.

Oats: Stem rust (*Puccinia graminis avenae*), Loose Smut (*Ustilago avenae*) and Covered Smut (*U. levis*) were recorded.

Barley: Covered Smut (*Ustilago hordei*), and Loose Smut (*U. nuda*) were prevalent. Stripe (*Helminthosporium gramineum*) was recorded from one locality.

Rye: Loose Smut (*Ustilago tritici*) was observed for the first time in this State.

Maize: Root and stalk rots (*Fusarium moniliforme* and *Gibberella saubinetii*) and Dry rot (*Diplodia zeae*) were fairly prevalent throughout all maize growing districts. The Cob-rot condition caused by *Fusarium moniliforme* was more than usually severe and was associated with comparatively heavy autumn and winter

(1) Communication from the official correspondent of the Institute, Mr. R. J. NOBLE, Ph. D., M. Sc., B. Sc. Agr., Biologist, Department of Agriculture, Sydney, New South Wales.

rains. Cob-rot (*Basisporium gallarum*) was recorded for the first time in this State. Leaf Blight (*Helminthosporium turcicum*) and Rust (*Puccinia sorghi*) were very prevalent on coastal areas which had been continuously cropped for some years.

Sorghum: Red Stain caused by *Colletotrichum* sp. and *Fusarium moniliforme* was prevalent in coastal areas. A bacterial disease of Sudan grass was attributed to *Bacterium holcicola.*

Rice: A non-parasitic condition involving spikelet sterility and a brownish or greyish discoloration of the glumes was prevalent on the Irrigation Areas. Up to 10 % of the crop was affected in several instances. The condition was attributed to the action of frost and low temperatures combined with drying winds at the heading out stage. Downy Mildew (*Sclerospora macrospora*) was recorded from the first time on this crop.

Lucerne: Rust (*Uromyces striatus*), Leaf Spot (*Pseudopeziza medicaginis*) and Downy Mildew (*Peronospora trifoliorum*) were more widespread than usual. Stem nematode (*Tylenchus dipsaci*) was recorded from additional areas.

A rosetted or spindle-shoot condition of unknown cause is widespread in lucerne growing areas. Infections generally do not exceed 2 per cent. of the crop.

Tobacco: Blue Mould (*Peronospora* sp.) caused serious losses in seed beds. Black Root Rot (*Thielavia basicola*) caused more damage than in the previous season.

Soy Beans: Bacterial Blight (*Bacterium glycineum*) and Bacterial pustule (*Bacterium phaseoli sojense*) were recorded in one locality.

Peanuts: Defective germination was caused by *Aspergillus niger* which caused rotting of stems and cotyledons.

Fruit crops.

Apples: Black Spot (*Venturia inaequalis*) was the most serious disease recorded. Powdery Mildew (*Podosphaera leucotricha*) was of less importance.

Physiological diseases included Internal Cork (Crinkle), Orchard pit and Watercore. Malformation caused by faulty pollination was associated with adverse weather conditions at blossoming.

Pears: Black Spot (*Venturia pirina*) seriously affected pears in certain districts.

Stone Fruits: Brown-rot (*Sclerotinia fructicola*) caused damage in coastal districts. Sour-sap (cause unknown) was also serious: 50 % of the trees showed the condition in several orchards.

Rust (*Tranzschelia punctata*) caused serious damage in coastal districts and also in inland irrigation areas. Freckle (*Cladosporium carpophilum*), Leaf Curl (*Exoascus deformans*) and Crown Gall (*Bacterium tumefaciens*) were of less importance.

Grapes: Downy Mildew (*Plasmopara viticola*) and Black Spot (*Gloeosporium ampelophagum*) caused serious damage in areas in which spraying had been neglected.

Citrus: Black Spot (*Phoma citricarpa*) seriously affected oranges and lemons. Brown Spot of mandarin (causal agency undescribed) was widespread in coastal districts. The average infection approximated 20 per cent. of the crop.

Scab (*Sporotrichum citri*) caused up to 100 % infection in lemons in unsprayed orchards. The average infection amounted to about 15 per cent. of the crop.

Root-rot (*Armillaria mellea*) was of little importance. Melanose (*Phomopsis citri*) was confined mainly to old orchards.

The Stem-end Rot (*Phomopsis citri*) was of less importance. Twig Blight (*Septobasidium* sp.) was of little importance although more prevalent in humid areas.

Brown-rot (*Phytophthora hibernalis*) caused up to 100 % infection in fruits in low lying areas.

Psorosis (Scaly Bark) was of minor importance. It occurs mainly on old and somewhat neglected orchards.

Physiological troubles of slight importance include Foliocellosis, Exanthema and Crinkle.

Citrus root nematode (*Tylenchulus semipenetrans*) is widely distributed but causes little damage.

Strawberries: Leaf Spot (*Mycosphaerella fragariae*) and Leaf Scorch (*Mollisia earliana*) were fairly prevalent.

Vegetable crops.

Beans: Bacterial Blight (*Bacterium phaseoli*) was the most serious and widespread disease attacking Canadian Wonder beans. Mosaic was also prevalent in this crop.

Anthracnose (*Colletotrichum lindemuthianum*) was prevalent in winter crops, but losses were obscured by the incidence also of Bacterial Blight.

Angular Leaf Spot (*Isariopsis griseola*) and Root-rot (*Fusarium* sp.) were of less importance.

Peas: Leaf Spot (*Ascochyta pisi*) and Blight (*Ascochyta pinodella*) caused most damage in metropolitan areas. Other diseases included: Bacterial Blight (*Bacterium pisi*), Root-rot (*Fusarium* sp.), Septoria spot (*Septoria pisi*), Downy Mildew (*Peronospora viciae*) and Powdery Mildew (*Erysiphe polygoni*).

Cabbages and cauliflowers: Diseases recorded in these crops included Black-leg (*Phoma lingam*), Black Rot (*Bacterium campestre*), Club-root (*Plasmodiophora brassicae*), Downy Mildew (*Peronospora parasitica*), Leaf Spot (*Cercospora* sp.) and Bacterial Spot (B. *maculicola*).

Whiptail (cause undetermined) caused serious damage in crops of cauliflowers; in some instances 100 % of the crops were affected.

Melons, squashes, etc. The following diseases were recorded: Root-rot (*Fusarium niveum*), Powdery Mildew (*Erysiphe cichoracearum*), Macrosporium blight (*Macrosporium cucumerinum*) and Septoria Leaf Spot (*Septoria cucurbitacearum*).

Onion: Downy Mildew (*Peronospora schleideni*) caused widespread infections on coastal areas.

Potatoes: Virus diseases caused most serious losses. Leaf Roll was recorded to the extent of 30-50 % in some districts. Mosaic was less important. The following diseases were also recorded: Late Blight (*Phytophthora infestans*). Fusarium wilt (*Fusarium oxysporum*), Early Blight (*Alternaria solani*), Scab (*Rhizoctonia solani* and *Actinomyces scabies*).

Tomatoes: Spotted wilt (virus) caused serious losses in individual crops. Mosaic (virus) and Rosette (unknown cause) were also present.

Late Blight (*Phytophthora infestans*) and Early Blight (*Alternaria solani*) caused minor losses. Fusarium wilt (*Fusarium lycopersici*) caused damage in susceptible varieties although losses were not as serious as in previous years. Verticillium wilt (*Verticillium* sp.), Septoria Leaf Spot (*Septoria lycopersici*) and Blossom End Rot (physiological) were also recorded.

Miscellaneous plants.

Chrysanthemum: Nematode disease (*Aphelenchus ritzema-bosi*) caused serious damage in one commercial area of these plants.

Roses: The following diseases were recorded. Rose wilt and dieback (virus), Root-rot (*Armillaria mellea* and *Hypholoma fasciculare*), Crown Gall (*Bacterium tumefaciens*), Black Spot (*Actinonema rosae*) and Mildew (*Sphaerotheca pannosa*).

Seychelles: Coconut Pests (1).

We have received lately the visit of Mr. Stockdale, Agricultural Adviser of the Colonial Office, and have been recommended by the latter for assistance from the Home Government in order to attach temporarily to this Colony the services of an expert entomologist in the biological control of scale insects. This Colony has been badly suffering for the last 10 years from scale insects' attack.

The coconut trees which form our staple crop have been so heavily blighted by three of these insects (*Aspidiotis ficus, Pinnaspis buxi* and *Ischnaspis filiformis*) that this industry is on the verge of becoming an unpaying proposition.

We are anxiously looking forward to the possibility of introducing new predators which will help us to keep down these pests. At present they are very unsatisfactorily controlled by a few species of parasitic fungi which develop spasmodic epidemics manifestly insufficient to keep down the pests. However our entomogenous fungus (*Pseudomicrocera Henningii*) is making headway in combating *Ischnaspis* and another white fungus (not yet identified) is also ridding plantations of *Pinnaspis* scales.

Switzerland: An Occasional Parasite on the Vine (2).

At the end of May 1931 the appearance was noted on certain vineyards in the neighbourhood of Morges of a small greenish black caterpillar attacking the young leaves and buds of the vine.

The insect is one of the Tortricidae, *Cnephasia wahlbomiana*, of very variable

(1) Communication from the official correspondent of the Institute, Mr. P. R. Dupont, Director of Agriculture, Seychelles.

(2) Communication from the official correspondent of the Institute, Dr. H. Faes, Director of the Station Fédérale d'essais viticoles, Lausanne (Montagibert).

colouring, with a grey-brown basis. The species which is widely spread is found all over Europe and extends to Japan.

The caterpillars observed this spring were from 6 to 8 mm. in length, and dark coloured, black or greenish black with pale brown head. Frequently the colour is much lighter.

The caterpillar of this *Cnephasia* is distinguished from that of other Tortricidae by its habit of rolling up at the least touch. It lives on a number of low growing plants, wild or cultivated, and in certain circumstances passes to the vine where it does only a slight amount of damage.

It is thus a question of an occasional parasite which need cause no anxiety to the vine growers of this country.

This caterpillar like many others is easily kept down by applications of the copper-arsenical mixture.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany (Anhalt) (1). — The Regulations of 23 September 1931 for the prevention of danger to human health from the preparations used in the control of rats and mice, state that these preparations are not without danger, specially for children and persons suffering from intestinal disorders. Such persons should not be employed in the preparation or distribution of the bait. Directors of works for this purpose are obliged to inform their employees of the precautions to be taken, such as not to eat or smoke during work and to wash the hands thoroughly with warm water and soap. The preparations must not be manufactured or mixed with bait in inhabited rooms, kitchens, etc. Any receptacle or instrument used in such work must be disinfected in boiling water for at least one hour after use.

It is forbidden to use bacterial preparations round wells, in or about inhabited houses, in slaughterhouses and in any premises used in the preparation or storage of foodstuffs or forage.

The preparations must be isolated from all forage and foodstuffs and placed in such a way that strangers cannot come near them.

Germany (Lower Silesia) (1). — By an Order of 11 July 1931 regulations concerning elm disease (*Graphium ulmi*) have been prescribed for the district of Breslau which are fundamentally similar to those contained in the Order of 31 March 1931 of the Free State of Bremen (see this *Bulletin*, 1931, No. 6, p. 97).

Germany (Thuringia) (1). — By Police Order of 15 July 1931 all owners or holders of land are obliged to cut all thistles before they come into flower. The Communal authorities must every year publicly order the destruction of thistles. A committee composed of representatives of the authorities and of the farmers must inspect the land and before July 15 of each year make a report to the authorities of the district. In any case of neglect the necessary work will be carried out by the police at the expense of the defaulter.

(1) Communication from the Biologische Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, official correspondent of the Institute.

Colombia (Republic of). — By Presidential Decree No. 1128 of 30 June 1931 the Plant Sanitary Service for the ports and frontier stations was organised. (República de Colombia. Ministerio de Industrias. *Boletín de Agricultura*, Bogotá, 1931, año IV, núms. 3 y 4, págs. 149 a 153).

Italy. — By Ministerial Decree of 14 and 20 August 1931 the communes of Sarnano and Petriolo in the province of Macerata have been declared infected with grape phylloxera. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 22 agosto 1931, anno 72°, n. 193, p. 4184; 25 agosto 1931, n. 195, p. 4213).

*** By Ministerial Decree of 18 September 1931 the Communes of Roccabascerana and Lioni (province of Avellino) were declared infected with grape phylloxera. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 25 settembre 1931, anno 72°, n. 222, p. 4708).

*** By Ministerial Decree of 26 September 1931 the Commune of Vicoforte in the province of Cuneo was declared infected with grape phylloxera. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 6 ottobre 1931, anno 72°, n. 231, p. 4883).

Union of South Africa (1). — By Proclamation *No. 173, 1931, of the Governor General, under the term 'plant' in section 2 of the Act No. 11 of 1911, amended by section 3 of the Act No. 6 of 1924, are included, from the date of this Proclamation, the fruits of all species of elm, the seeds of lucerne, tea and tomatoes.

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(1) Communication from the official correspondent of the Institute, Miss E. M. DOIDGE, M. A., D. Sc., F. L. S., Principal Plant Pathologist, Plant Pathological Section, Division of Plant Industry, Department of Agriculture, Pretoria, Union of South Africa.

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DISCOVERIES AND CURRENT EVENTS *

Algeria: The Presence of *Merodon geniculatus* in the Vicinity of Algiers (1).

On 7 March 1931 the withering and death of numbers of bulbs of ornamental Amaryllidaceae were reported at Rouïba near Algiers. The bulbs, certain of which were very valuable, were found to be attacked internally by the reddish larvae of a Syrphid, *Merodon geniculatus*, Strobl. Some already contained nymphs even at this season. The tissues round the attacked zone were liquified into a reddish brown deliquescent jelly in which a number of other insects were living.

Breeding experiments at the Insectarium of the Experimental Gardens of Hamma showed that the first hatching took place on 14 April, the main hatching from 20 to 25 April and the end of hatching on 15 May.

Dr. Villeneuve, who kindly identified the species, reported that the life history of this *Merodon*, examples of which he had obtained previously only from Orléansville and Spain, was absolutely normal, the larvae living in the bulbs of Liliaceae and specially in those of the genus *Narcissus* of the Amaryllidaceae.

Seeing that the *Diptera cyclorhapha* have several larval moults and that the pupal stage begins as soon as the genital glands are mature it was to be expected that laying should occur soon after hatching. The sample confirmed the rule : — on 25 August a further consignment reached us from the same place as the first containing also larvae and nymphs of the Dipteron.

The principal hatching was recorded on 10 September.

Meanwhile a treatment had been started, steeping the bulbs in a decoction of *Derris*. The negative result obtained showed the inefficiency of this treatment. Now the effect of spreading crude naphthaline at the experimental dose of 300 kg to the hectare is to be tried.

No parasite has been discovered in the course of the breeding experiments, though these have been fairly abundant. All that has been found is a varied fauna of saprophytic Diptera :— *Sciara* sp. ?, *Helemyza variegata* Lw., *Lonchaea splendida* Lw., *Scatopse* sp. ?, *Drosophila funebris* F., *D. buscki* (*rubrolineata* Beck) [identified by Dr. Villeneuve] and a Staphylidid, *Atheta pertyi* [identified by Mr. de Peyerimhoff].

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* In this, as in the next chapter the countries are arranged in French alphabetical order.

(1) Communication from the official correspondent of the Institute, Mr. DELASSUS, Plant Protection Inspector, General Government of Algeria, Algiers.

Eritrea: Locusts (*Locusta migratorioides* and *Schistocerca gregaria*) (1).

During September 1931 neither on the upland plateau nor in the eastern plain were eggs or hatching reported.

The destruction of the breeding centres reported towards the end of August at Addi Samuel (Seraè) and in the Hazamò plain has been completed.

On 2 and 3 September two swarms of *Locusta migratorioides* passed over Cheren, one from the north flying south-east, the other from the north-east flying south-west.

At Seroà and Menabir in the territory of Cheren on 2 September egg laying by a large swarm of adults was observed, and on the 10th the hatching of hoppers at Sebat Crid.

On 21 September a swarm of *L. migratorioides* coming from the Tigrai crossed over the Mareb and entered the Colony; on the 22nd a swarm of *Schistocerca gregaria* from Dembelas, after passing over Tucul, crossed the frontier.

Infestation of the territories of the western plain was however somewhat serious. Numbers of groups of hoppers were reported in the vicinity of Agordat, Tessenei, in many places along the Gasc and in the Cunama (Barentù, Lacatacura).

On 4 September a swarm coming from the Tigrai flew over Ducambia; on the 10th another swarm coming from the Anglo-Egyptian Sudan flew in the direction of the upper Gasc. A number of gangs under white leadership destroyed large quantities of hoppers with poisoned bait.

There was serious damage to crops in the weastern plain and in the territory of Cheren.

During the first ten days of the month swarms were reported in the eastern Jeggiù, in Erichiè and Mogetiè (Abyssinia).

Numerous swarms of locusts were reported during October 1931 over the whole territory of the Colony.

The greater number were composed of *L. migratorioides*. Large swarms from the western plains followed as usual up the valleys of the Barca and Gasch to the uplands. After a short stay in the Tzellimà (Seraè), in the neighbourhood of Adi Caièh (Acchelè Guzai) and in the territory of Cheren they flew away again in the direction of the eastern plain.

Numerous breeding centres with hoppers of *L. migratorioides* were reported and destroyed in the Dembelas and in the vicinity of Tucul (Seraè).

Other centres with hoppers of *Schist. gregaria* and *L. migratorioides* were reported in the territories of Cheren, Agordat and Barentú.

On October 1, 9 and 15 swarms of *Schist. gregaria* of uncertain colour penetrated into Eritrean territory from the Anglo-Egyptian Sudan.

Towards the end of the month these locusts had reached the eastern plain.

On October 21 and 23 two swarms, one of which was certainly composed of *Schist. gregaria*, coming from the sea (island of Dalac), after having passed over Uachiro flew towards the west.

On October 15 and 19 two swarms of *L. migratorioides* were reported in the Tabeh valley, in the northern part of the eastern plain, flying from the Aighet mountains in an easterly direction.

On October 2 and 10 numbers of locusts were reported beyond the Abyssinian

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(1) Communication from the official correspondent of the Institute, Dr. A. De Benedictis, Head of the Agricultural Office of Eritrea, transmitted by the Government of the Colony.

frontier coming from the Dankali plain ; they flew towards the territories of Marta Giun, Golba, Mersk and Basciaiciaffè (Jeggiú) where they alighted.

Certain crops were seriously damaged.

United States of America : Notes on Plant Diseases (1).

The term ' market pathology ' is used in the United States to designate the study of diseases and rots of fruits and vegetables on the market as distinguished from those diseases which occur especially in the field.

Since the inception of the Food Products Inspection Service by the Bureau of Agricultural Economics, increasing attention has been given to this work which is, of course, carried on chiefly in such large consuming centers as New York and Chicago. The following reports were received from Mr. C. O. Bratley, who is stationed in New York City engaged in the study of market pathology.

During April several steamer shipments of honeydew melons from Chile arrived in New York. The average decay in four of these lots was about 15 per cent. Fusarium was the principal decay. More than half of the decay was found at the stem end of the melon. Apparently the cut stem served as an infection court from which the fungus grew down into the fruit. Frequently only a small decayed area was visible at the stem but on cutting the melon open the seed cavity would be found to be completely filled with white fluffy mycelium.

During June many white cherries from California received in New York showed small rotted areas, each covered with a small tuft of white mycelium. In most cases the decay followed skin punctures. Cultures from this type of decay yielded consistently a species of Cladosporium which by inoculation was proved to be definitely pathogenic. The decay produced by the Cladosporium developed slowly. Six days after inoculation the areas were approximately 5 mm. in diameter.

For several seasons it has been noted that the appearance of Napoleon cherries from California and the Northwest arriving on the New York market has been marred by the presence of darkened areas in the flesh of the fruit. Sometimes as many as three-fourths of the cherries on the surface of an otherwise perfect pack would be discolored. The blemish appears as a translucent, rather watery brownish discoloration beneath the skin of the cherry. There is no definite line of demarkation between the affected and the healthy tissue. The discoloration of the cherries in the face of the pack is due to pressure by the lid of the lug and is severe only when the pack shows too much bulge. In the interior of the pack the discoloration is found in cherries which have been pressed together in packing. An occasional cherry which has been dented in by its neighbors will be entirely black. In very loosely packed lugs the cherries next to the lid often exhibit a scalded appearance of the epidermis. To determine the amount of bruising necessary to induce the discoloration, several cherries were pressed lightly between two wooden strips. Generally, when a cherry was subjected to a pressure greater than four pounds the discoloration was produced.

(1) Communication from the official correspondent of the Institute, Dr. Neil E. Stevens, Senior Pathologist, Plant Disease Survey, Bureau of Plant Industry, United States Department of Agriculture, Washington.

India: A Successful Trap for Red Cotton Bugs (*Dysdercus cingulatus*) (1).

Hibiscus abelmoschus when in pods has been found to be very attractive to these bugs which swarm on it from the whole neighbourhood. In the Entomological experimental area one fourth acre each of Cambodia and Acala cottons and one-twenty first acre of *H. abelmoschus* were grown. Daily collections showed that while there were hundreds of bugs on *H. abelmoschus* there would be only a few on cotton.

Further work is in hand and details will be published later on.

Italian Somaliland: Desert Locust *(Schistocerca gregaria)* (2).

On 2 November 1931 swarms of locust coming from Kenya appeared over the territory of Oddur, Bardera and Baidoa. During the following days locusts alighted in the territory of Merca and eggs were deposited.

There was little damage to crops.

Control was carried out with poisoned bait and physical methods.

* * *

A later communication from the Government of Italian Somaliland states that during November throughout the whole country, including Migiurtinia and Nogal, great numbers of swarms were reported and eggs were laid, particularly in the Alto Giuba, the Rahanuen district, in the zone of Baidoa, at Genale and in the Villaggio Duca degli Abruzzi.

The damage so far has not been serious. Native crops have suffered most, losing the greater part of the harvest.

Control measures are being continued.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany (Brunswick) (3). — The Order No. 102 of 7 September 1931, based on the Law of 7 September 1931, concerning the manufacture and sale of preparations containing bacteria for the control of animal pests, requires a special police permit for the manufacture and sale of such products. Such permits will be granted only to competent persons and in cases of recognized necessity. Premises for the preparation and sale will be under the control of the police and medical authorities. Bacterial cultures for infecting bait as well as the preparations themselves must be kept carefully out of reach of incompetent persons. All infected material must

(1) Communication from the official correspondent of the Institute, Mr. C. C. Ghosh, B. A., F. E. S., Entomologist, Agricultural College, Mandalay, Burma.

(2) Communication from the Royal Government of Italian Somaliland, transmitted by the Ministry for the Colonies ('Ufficio Studi e Propaganda').

(3) Communication from the Biologische Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, official correspondent of the Institute.

be removed immediately after use, so as to prevent any possibility of dispersion of the bacteria.

Persons producing the preparations must keep up-to-date registers. These registers will serve for the control of the nature and duration of virulence of the cultures used and will make it possible to see clearly the sales and the destinations of the preparations.

Bacterial preparations must be delivered in hermetically sealed glass receptacles or test-tubes and carefully packed. The receptacles must bear a label indicating the control number, the place of production, the nature and duration of the efficacy of the preparation. Each package must be accompanied by directions for use and by a copy of the instructions drawn up by the German Service of Public Health.

It is forbidden to prepare or keep products intended for human use or for domestic animals in premises reserved for the preparation and storage of the culture in question.

Germany (Prussia) (1). — An Order of the Minister of Agriculture, Lands and Forests dated 16 September 1931 contains regulations concerning the use of poisons in fields. It does not prevent the use of preparations of squill nor of poisons against slugs, insects and worms, nor the spreading of poisons from the air.

The use of poisons is authorised in the following cases :— (*a*) in the control of rats and mice with poisoned seeds, or with phosphorus preparations, that are introduced into their holes or otherwise concealed in such a way as to prevent other animals from reaching them ; (*b*) in the control of crows and magpies with phosphorus poisoned eggs ; eggs remaining untouched must be collected at latest after three days ; (*c*) in the control of dogs and wild cats ; for this purpose poisoned carrion may be used. Authorisation will be given solely to the owner of the land or of the game rights on proof that the vermin to be destroyed has done considerable damage ; a notice must be placed wherever poisoned carrion has been distributed.

Places where poisoned bait has been spread must be inspected every day, or, if they are very distant, at least every two days by reliable persons.

Any offences will be punishable. Authorisation may moreover be withdrawn from persons not complying with the regulations or who are found not to be reliable.

Germany (Schleswig Holstein) (1). — By an Order of the First President of the province of Schleswig Holstein dated 12 August 1931, it is established that any person desiring to disinfect with chemicals seed grain for other than his own use shall first obtain a permit from the First President, who will grant it or, when necessary, withdraw it, on the recommendation of the principal Plant Protection Station of Kiel. A list of the persons holding such a permit will be published each year. The premises in which disinfection is carried out are under police control. It is forbidden to use for disinfection preparations and concentrations other than those specified on leaflet No. 7 issued by the Biologische Reichsanstalt für Land- und wirtschaft, Berlin-Dahlem.

England. — By an Order of October 15, 1931 in view of the rapid spread of the Colorado potato beetle (*Leptinotarsa decemlineata*, Say) in France, the importation of potatoes from any part of France into England or Wales is prohibited as from March 15, 1932. Nursery stock and living plants (including bulbs, cuttings,

(1) Communication from the Biologische Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, official correspondent of the Institute.

etc., but not cut flowers or vegetables for consumption) will be admitted only if they are officially certified not to have been grown within 200 kilometres of any place where *L. decemlineata* exists or has been known to exist ; between March 15 and October 14, in each year, the admission of raw vegetables, including tomatoes, onions, aubergines and salads, will be subject to the same restriction. (*Statutory Rules and Orders, 1931, No. 879. The Colorado Beetle Order of 1931. Dated October 15, 1931.* London, 4 pp.).

Western Australia. — On 1st October 1931 (Agric. No. 2070/25 ; Ex. Co. No. 1762) the Director of Agriculture notified that *Watsonia* has been declared a noxious weed within the boundaries of the Murray Road Board District. (*Government Gazette of Western Australia*, Perth, October 2, 1931, No. 52, p. 2213).

Canada. — By Order of the Governor General dated 21 July 1931 Regulations Nos. 6 and 10 (foreign) and No. 9 (domestic) have been rescinded and replaced by the following :—

(1) Regulation No. 6 (foreign), 1st revision.

It is forbidden to import into Canada from any foreign country any five-leaved species of the genus *Pinus* or garden varieties thereof.

The importation from Europe of the Austrian pine (*P. nigra* Arnold), the Swiss mountain pine (*P. Mugo* Turra), the Scots pine (*P. sylvestris* L.) and their garden varieties is also forbidden.

(2) Regulation No. 10 (foreign), 6th revision.

The importation into Canada of plants or plant parts belonging to the following species coming from the areas specified below is forbidden except in accordance with the conditions set forth in Art. 2 :—

Art. 1. — (*a*) Maize and broom corn (including all parts of the plant, all millets and Sudan grass) coming from the following States of the United States of America:— Connecticut, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, Ohio, Pennsylvania, Rhode Island, Vermont and West Virginia ;

(*b*) During the period between 1 June and 31 December cut flowers and whole plants of chrysanthemums, asters, cosmos, zinnias, hollyhocks ; cut flowers or whole plants of gladiolus and dahlias with the exception of their bulbs and roots without stems ; oats and rye straw, as such or used as packing material ; celery, green beans in the pod, beets with stems and rhubarb, coming from the States of Connecticut, Maine, Massachusetts, New Hampshire and Rhode Island.

The products listed above may however, by passing through the above-mentioned States, be imported into Canada from any of the United States of America if consigned under direct delivery note, or if accompanied by a certificate signed by an authorised official of the Ministry of Agriculture of the United States or of the Ministry of Agriculture of one of the United States of America, declaring the State of provenance.

Art. 2. — (*a*) Broom corn for manufacture ; clean grain of maize for seed or as stock feed and clean grain of broom corn may be imported from the States listed in paragraph (*a*) of Art. 1. Consignments shall, however, be accompanied by a certificate of inspection issued by an authorised official of the Ministry of Agriculture of the United States certifying that the consignment is free from the European corn borer [*Pyrausta nubilalis*].

(*b*) The products named in paragraph (*b*) of Art. 1 above may be imported within the time specified ; they shall however be accompanied by a certificate of inspection issued by an official authorised by the Ministry of Agriculture of the United States stating that the consignment is free from the European corn borer. No certificate is required for these products between 1 January and 31 May.

(*c*) This regulation does not apply to the plants and plant parts specified if they they have been processed or treated in such a way as to remove all risk of their carrying the European corn borer.

(3) Regulation No. 9 (domestic), 1st revision.

Art. 1. — The transport of the satin moth (*Stilpnotia salicis* L.) in any stage of its life history, or of any part of any species, hybrid or garden variety of the genera *Salix* (willow) and *Populus* (poplar), from one to another of the areas mentioned in paragraphs (*a*) and (*b*), is forbidden except in accordance with the conditions of Art. 2 below :—

(*a*) The area composed of the provinces of New Brunswick, Nova Scotia and Prince Edward Island ;

(*b*) The entire part of the province of British Columbia situated south of a line stretched from the town of Hazelton in a westward direction, passing to the north of the islands of Somerville, Dundas and Langara, and extending to the west of a series of straight lines running from the town of Hazelton to the town of Hope and from there directly south to the Canadian frontier.

The points on the railways to the east of which poplars and willows may not be transported outside the quarantine area are :— Hope on the Canadian National Railway ; Haig, on the Canadian Pacific Railway ; Pemberton, on the Pacific Great Eastern Railway; and Hazelton, on the Prince Rupert branch of the Canadian National Railway.

No restrictions are imposed on the movement of poplars and willows within the limits of the quarantine area.

Art. 2. — The transport of willows and poplars from points within the quarantine area to points outside the said area may be authorised under one or other of the following conditions :—

(*a*) If they have been treated in such a way as to remove all risk of transporting the satin moth in any stage of its life history, and if they are accompanied by a certificate issued by an inspector duly nominated under the Destructive Insects and Other Pests Law.

(*b*) If they are sent from a non-quarantine area on direct delivery note, or if they are imported from a non-quarantine area for immediate re-exportation. (*The Canada Gazette*, Ottawa, August 8, 1931, Vol. LXV, No. 6, pp. 364-365).

Spain. — By ' orden ' of 3 November 1931, coming into force on the 6th of the same month, it is forbidden to import potato tubers, leaves, haulm or peel and their packing materials from Poland, Germany, France and any other European countries infested with the Colorado beetle (' chinche del Colorado', *Leptinotarsa decemlineata*). (*Gaceta de Madrid*, Madrid, 6 noviembre 1931, año CCLXX, núm. 310, pág. 812).

*** By ' orden ' of 9 November 1931 it is allowed to import from continental France plants with their roots covered with the smallest practicable quantity of soil, belonging to the Coniferae, Ericaceae, Geraniaceae, Myrtaceae, Palmae, ferns, also magnolias, camelias and other plants which may be sent from Holland

and Belgium in virtue of special concessions (cf. this *Bulletin*, 1930, No. 4, pp. 59-60 ; No. 11, pp. 171 172). The regulations controlling importation from France are practically identical with those already established for Holland and Belgium. (*Gaceta de Madrid*, Madrid, 10 noviembre 1931, año CCI.XX, núm. 314, págs. 894 y 895).

Italy. — By Ministerial Decree of 9 September 1931 the Royal Observatories for Plant Diseases referred to in Art. 22 of the Law No. 987 of 18 June 1931 (cf. this *Bulletin*, 1931, No. 9, p. 166) are confirmed at the headquarters and for the districts specified in the Ministerial Decree of 1 July 1929 (cf. this *Bulletin*, 1929, No. 9, pp. 137-138). (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 20 ottobre 1931, anno 72°, n. 243, p. 5122).

*** By Ministerial Decree of 31 October 1931 the commune of Ricigliano in the province of Salerno has been declared infected with grape phylloxera. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 13 novembre 1931, anno 72°, n. 262, p. 5534).

*** By Ministerial Decree of 5 November 1931 the time limit for the presentation of entries for the competition for the compilation of a manual of diseases of crop plants and a manual of insect pests of crop plants opened by Ministerial Decree of 21 June 1931 (cf. this *Bulletin*, 1931, No 10, p. 189), has been extended to 15 March 1932. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 23 novembre 1931, anno 72°, n. 270, p. 5696).

Latvia (1). — A law published on 28 May 1931 (*Valdibas Vēstnesis*, N° 115) makes obligatory the protection of plants. The list of plant diseases and pests and noxious plants to be controlled will be established by the Minister of Agriculture. The inspection of fields, gardens and woods and the supervision of control methods, of importation and exportation of living plants will be undertaken by the Minister. The Minister has also the right of issuing quarantine orders and ordering the destruction of infested crops. Compensation may be granted on the decision of a Commission nominated by the Minister of Agriculture for any damage caused by these measures. The prescribed measures will be carried out by the Minister of Agriculture at the expense of the persons concerned if owners or holders of land fail to comply with the regulations. Offences will be punishable under the penal code.

New Zealand. — By special order made by the Waitaki County Council on the 26 June 1931 and published by the Minister of Agriculture on the 7 July 1931 (Notice No. Ag. 2979), African boxthorn (*Lycium horridum*) is declared to be a noxious weed in the Waitaki County. (*The New Zealand Gazette*, Wellington, July 9, 1931, Numb. 52, p. 2083).

Peru. — By Decree-Law No. 7097 dated 14 April 1931 and by ' resolución ' of the 16th of the same month it has been determined that the costs of the campaign for the control of *Diaphania* sp., a Microlepidopteron injurious to the olive in the Ilo Valley, province of Moquegua, shall be provided from the funds of the ' Caja de Depósitos y Consignaciones ' up to a sum of 15,000 gold ' soles '. (*La Vida Agrícola*, Lima, 1931, vol. VIII, no. 91, págs. 436 y 437).

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(1) Communication from the official correspondent of the Institute, Prof. M. Eglits, Director of the Phytopathological Laboratory of the University, Riga.

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[*Phytophthora palmivora*, *Rosellinia* spp., *Marasmius perniciosus*, on cacao ; ' bronze leaf wilt ' (non-parasitic disease), *Aphelenchus coccophilus*, *Phyt. palmivora*, on the coconut ; ' mosaic ', ' root disease ' (caused by various unidentified fungi), on sugar cane ; *Gloeosporium limetticolum*, ' root disease ', ' gummosis ', *Cladosporium Citri*, on *Citrus* spp. ; *Cercospora coffeicola*, *Omphalia flavida*, *Sclerotium coffeicolum*, on coffee].

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[This volume, which forms part of the collection of the ' Quinzaine Nationale de la Production Agricole d'Outre-Mer ', contains, in addition to the programme of the Congress and the report of the proceedings, the following reports which were delivered at the Congress :—

Les Acridiens migrateurs (M. P. VAYSSIÈRE). — Les Vertébrés nuisibles aux Colonies (M. CHAPPELLIER). — Organisation de la lutte et mesures de protection prises contre les parasites et maladies des cultures. Améliorations à y apporter. Algérie (MM. DELASSUS et R. PASQUIER). — Les ennemis des cultures en Tunisie (M. CH. CHABROLIN). — Les ennemis des cultures au Maroc (M. REGNIER). — Les ennemis des cultures en Afrique occidentale française (GOUVERNEMENT GÉNÉRAL DE L'A. O. F.). — Les ennemis des cultures en Afrique équatoriale française (GOUVERNEMENT GÉNÉRAL DE L'A. E. F.). — Les ennemis des cultures au Cameroun (COMMISSARIAT DE LA RÉPUBLIQUE FRANÇAISE A YAUNDÉ [CAMEROUN]). — Organisation de la lutte et mesures de protection prises contre les parasites et maladies des cultures. Améliorations à y apporter. Indochine (MM. HUBERT BARAT et ROBERT L. COMMUN). — Les ennemis des cultures en Syrie (DIRECTION DE L'AGRICULTURE ET DES SERVICES ÉCONOMIQUES). — Les ennemis des cultures à Madagascar (MM. CL. FRAPPA et G. BOURIQUET). — Organisation de la lutte et mesures de protection prises contre les parasites et maladies des cultures. Améliorations à y apporter. Ile de la Réunion (M. A. KOPP). — Les ennemis des cultures en Nouvelle-Calédonie, aux Nouvelles-Hébrides, aux Iles Loyautés et aux Iles Wallis (M. RISBEC). — La police sanitaire des végétaux métropolitaine et coloniale dans ses rapports internationaux (M. J.-M. SAULNIER). — L'organisation des recherches entomologiques et phytopathologiques aux Colonies (MM. A. MAUBLANC et P. VAYSSIÈRE). — L'organisation d'un Service météorologique colonial adapté aux besoins agricoles et en particulier à la « lutte contre les ennemis des cultures » (M. le Général DELCAMBRE)].

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NOTES

Forest Pathology at the International Congress of Timber and Forestry, Paris, 1931. — The following recommendations were *inter alia* adopted by the Congress:—

In view of the fact that trees of many genera, particularly *Ulmus*, *Castanea*, *Populus*, *Pseudotsuga* are all to a greater or less degree seriously affected by cryptogamic diseases,

That in each genus there appear to be species, varieties, strains, forms and hybrids that are specially resistant to these diseases,

The Congress expresses the hope,

That experimental work for the discovery of the species, varieties, strains, forms and hybrids having a relatively high degree of resistance, will be organised and carried out in the different regions or countries and more particularly where trees affected by such diseases are to be found.

PROF. ALESSANDRO BRIZI, *Segretario generale dell'Istituto, Direttore responsabile.*